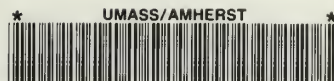


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The Intermodal Transportation Plan for the Commonwealth of Massachusetts

Prepared by the
Executive Office of Transportation and Construction
Bureau of Transportation Planning & Development



William F. Weld
Governor

Argeo Paul Cellucci
Lieutenant Governor

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Secretary of Transportation



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Accessing the Future

The Intermodal Transportation Plan for the Commonwealth of Massachusetts

Draft, October 1994

Prepared by the

*Executive Office of Transportation and Construction
Bureau of Transportation Planning and Development*

in Cooperation with

*Federal Highway Administration
Federal Transit Administration
Executive Office of Environmental Affairs
Executive Office of Economic Affairs
Governor's Highway Safety Bureau
Massachusetts Highway Department
Massachusetts Bay Transportation Authority
Massachusetts Aeronautics Commission
Massachusetts Port Authority
Massachusetts Turnpike Authority
Massachusetts Association of Regional Planning Agencies
Massachusetts Association of Regional Transit Authorities*

with Assistance Provided by

*Massachusetts Regional Planning Agencies
Boston MPO Central Transportation Planning Staff
Cambridge Systematics, Inc.
Howard/Stein-Hudson Associates*

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INTRODUCTION TO ACCESSING THE FUTURE

An efficient transportation system is crucial to the economic vitality and livability of Massachusetts. **Accessing the Future**, the Intermodal Transportation Plan for the Commonwealth of Massachusetts, was developed to guide our transportation decisions into the 21st century. The challenge that we face is daunting: to ensure maximum mobility for everyone that lives or conducts business in Massachusetts in an era of constrained financial resources. And, as we face this challenge, we must continue to foster economic growth and protect our environment. We believe that this challenge can be met; **Accessing the Future** is an important step in meeting it.

Accessing the Future is divided into three parts. Part One, **Advancing Our Mission**, focuses on the mission of our transportation system, as well as the policies, goals, and objectives that need to be accomplished to achieve that mission. Part One continues with **Moving Forward**, a chapter that first describes some of the strategies and actions that are planned or are currently being implemented that further our goals, and then outlines the steps that still need to be taken to translate our policies and goals into strategies and actions. Part One concluded with summaries of all thirteen regional transportation plans, since the regional planning process is among the major avenues for the implementation of transportation policy.

Part Two, **Foundations for Planning**, presents discussions of the underpinnings of our transportation planning process in Massachusetts. First, a description of our extensive Massachusetts transportation system is presented, including a summary of how it is used and by whom. The next chapter summarizes the regulatory framework within which transportation planning must be accomplished. The final chapter summarizes how Massachusetts is organized to respond to the regulatory requirements.

Part Three, **Issues for Consideration**, discusses three issues that cut across the fabric of our transportation planning process: the implementation of federally-mandated Management Systems; the need to fund our transportation system in an era of fiscal constraint; and the role that transportation plays in the protection and enhancement of our environment.

Accessing the Future was prepared by the Executive Office of Transportation and Construction, Bureau of Transportation Planning and Development, with the assistance of the Boston MPO Central Transportation Planning Staff, Cambridge Systematics, Inc., Howard/Stein-Hudson Associates, and the Massachusetts Regional Planning Agencies, under the direction of an Executive Steering Committee comprised of the following organizations:

Federal Highway Administration
Executive Office of Environmental Affairs
Massachusetts Highway Department
Massachusetts Bay Transportation Authority
Massachusetts Port Authority

Federal Transit Administration
Executive Office of Economic Affairs
Governor's Highway Safety Bureau
Massachusetts Aeronautics Commission
Massachusetts Turnpike Authority

Massachusetts Association of Regional Planning Agencies
Massachusetts Association of Regional Transit Authorities

Accessing the Future

Part One: Advancing the Mission

- Chapter 1: The Mission of Our Transportation System
- Chapter 2: Policies, Goals, and Objectives
- Chapter 3: Moving Forward
- Chapter 4: Regional Transportation Plan Summaries

CHAPTER 1

THE MISSION OF OUR TRANSPORTATION SYSTEM

Our transportation system is more than a network of streets, sidewalks, bikeways, highways, transit lines, airports, railroads and shipping lanes. It is the connective tissue of the body politic. Every facet of our lives, therefore, is dependent on the ability to move people, goods, and services in a timely and efficient manner. **Accessing the Future**, The Intermodal Transportation Plan for the Commonwealth of Massachusetts, presents a vision of our transportation future that is rooted in the desire to sustain that ability. It is a plan based on the principles from which our vision arises: individual freedom, market economics, and personal mobility. These are the principles from which we have fashioned our way of life. Nowhere on Earth at any time in history have more people had more freedom, a higher standard of living and greater mobility than in the United States today. The challenge facing us as we approach the 21st Century is to enhance this mobility and foster our economic growth as we protect our environment and quality of life.

GUIDING PRINCIPLES

As we craft a vision for the next century, it is clear that transportation is only one component of a greater vision for Massachusetts. To the greatest extent possible, this vision should be compatible with the legacy bequeathed to us by the Founding Fathers of our Nation. We believe that transportation policy should embrace the following principles:

1. **The protection of freedom is the first and most important role of government.** We believe that personal mobility is a basic tenet of such freedom, and that mobility should be available to all, regardless of personal physical limitations or cost.
2. **Government should play an active role in assuring a high quality of life for the people of Massachusetts.** Economic growth and environmental protection must be a collaborative effort if we are to maintain a high standard of living consistent with the concept of a sustainable society. We must preserve the cultural, historic, and scenic attributes that enrich our lives and attract visitors from around the world.
3. **Economic growth is a necessity.** Massachusetts must continue to declare that the Commonwealth is open for business. Economic growth and opportunity will be a principal social program of the future.

We also believe that the Massachusetts transportation system should be the product of an integrated and cooperative planning process that provides extensive opportunities for public participation. The stewardship of our transportation system is an immense challenge for all of us that requires a clear and comprehensive plan of action.

TRANSPORTATION MISSION

As a first step in developing that plan of action, the foregoing guiding principles were used as a framework for the development of our transportation mission statement:

It is the mission of the transportation agencies of the Commonwealth of Massachusetts, under the direction of the Governor and the Secretary of Transportation, to maintain and operate a safe and cost-effective statewide transportation system that provides increased mobility for people and goods. The system shall be fully coordinated and multimodal, be developed through the use of an open and cooperative public process, and promote economic growth and environmental sensitivity.

Our Commitment to Personal Freedom Through Increased Mobility and System Access

Throughout most of our history, transportation planning and development have taken place somewhat independently. Highway and transit systems were commissioned in the late nineteenth century; railroads and canals were well established by the mid-nineteenth century; our maritime traditions date back to the early seventeenth century. Our transportation heritage is a mature and extensive multimodal transportation network planned, until recently, without deliberate consideration for how one mode might be linked to another to maximize our investment in the total system.

In 1991, the Intermodal Surface Transportation Efficiency Act (ISTEA) codified, into federal law, changes in transportation planning designed to maximize investment in transportation infrastructure through greater integration of the different modes. Implementing the requirements of ISTEA in an era of limited financial resources precludes our continued pursuit of improvements to one mode without consideration of how it relates to another. We must now connect highways with mass transit, and link these modes with rail lines, bus stations, ports, and airports, and we must make all these facilities bicycle and pedestrian friendly. We must become truly intermodal, and at the same time, ensure that our intermodal system is available to all, regardless of personal physical limitations or cost.

The creation of an intermodal transportation "system" is only the first step towards achieving environmentally responsible mobility. We must educate and encourage the public to utilize the entire transportation system to exercise their travel options. For this to occur, travel choices other than private automobiles must offer real cost and time savings and deliver safe, comfortable, and convenient service.

Our Commitment to Protect and Enhance the Environment

The pursuit and use of natural resources have traditionally been one of the driving economic forces in the United States. While many attributed the conquest of the North American continent to manifest destiny, the people who pioneered the west were often motivated by the available and abundant wealth in land and other natural resources. Now, as a mature society of over 250 million people, we can no longer exploit our environment without jeopardizing our future and that of our children. Our culture, our economy, our way of life must be sustainable if our society is to remain viable.

With the passage of the Clean Air Act Amendments of 1990 (CAAA), environmental issues ceased to be an abstraction to transportation planners. Today, conformity with clean air requirements is as important an objective as mobility. Massachusetts is committed to attainment of National Ambient Air Quality Standards (NAAQS). The challenge faced by transportation planners is to reduce mobile source emissions while expanding travel choices and enhancing mobility for the traveling public.

While compliance with clean air requirements represents the greatest regulatory challenge facing Massachusetts, it is only one part of a holistic environmental policy. In addition to improving air quality, protecting and restoring our water resources is a major priority. In particular, the importance of watersheds has reshaped regional thinking. Pollution generated in one community can reappear in the wells of another. The man-made boundaries and jurisdictions that we abide by above ground are not obstacles to the flow of surface and underground waters.

In recent years, the scope of environmental issues has expanded beyond the parameters of air and water quality. Massachusetts has made an unprecedented commitment to preserving open space as well as the scenic, historic, and cultural resources that delight our citizens and attract visitors from around the world. The question then becomes: Is this ambitious environmental agenda compatible with robust economic growth? The answer is yes! Our environmental assets are one of the greatest competitive advantages we have; they are not a liability.

Our Commitment to Economic Growth

Public investment in transportation infrastructure promotes economic growth and increases productivity by making private capital investment more efficient. The ability to move goods and services quickly and inexpensively is an important competitive advantage that we must maintain and enhance. Cost-benefit analysis suggests that the positive impact of transportation infrastructure on productivity surpasses many other services provided by government. By investing wisely in our transportation infrastructure we can improve productivity and become more competitive and increase the availability of good jobs. An integrated transportation system will provide access to these jobs and access to a better life for the people of Massachusetts. In a highly competitive global market our extensive transportation system positions us well to challenge other countries for value-added industries and the high wage jobs they generate. Future investments must strategically target projects and venues that will return the maximum economic dividends. Transportation projects should leverage long term benefits, such as permanent job creation, in addition to the temporary jobs generated by construction.

Competitiveness and productivity are vital prerequisites of economic growth. To realize our potential, we must broaden our economic horizons. Fertile foreign markets remain uncultivated by many local companies. By aggressively upgrading our ports, waterways, airport and rail facilities into full service intermodal trade centers, we can help to open foreign markets to local companies. Instead of working at cross purposes, Massachusetts companies, working with State Government, can expand their markets and grow their businesses.

At the same time we expand exports, we should also make a concerted effort to attract more tourists. Our historic and cultural attractions plus the diverse beauty of our natural resources draw tourists to Massachusetts from around the world. To improve our position as a destination for tourists would not require major capital investments; minor improvements would greatly enhance existing attractions and facilities and make them more visitor-friendly.

Accessing the Future, along with **Choosing To Compete: the Statewide Strategy for Job Creation**, produced by the Executive Office of Economic Affairs and the University of Massachusetts, are integral components of a statewide strategy for job creation and economic growth. Both documents stress the importance of maximizing our investments to achieve the greatest long term economic benefits.

TRANSPORTATION POLICIES

This plan is much more than a philosophical statement. It is the challenge to undertake and achieve our ambitious mission related to our transportation future. The first link in accomplishing that mission is the formation of transportation policies. Seven policies, shown on Table 1-1, have been developed to guide all transportation planning and implementation activities to ensure that our mission can be achieved. These policies serve as the basis for the establishment of the goals and objectives discussed in the next chapter of **Accessing the Future**.

Table 1-1

COMMONWEALTH OF MASSACHUSETTS TRANSPORTATION POLICIES

- I. The Massachusetts transportation system shall be the product of an integrated and cooperative planning process that provides extensive opportunities for public participation.
- II. The Massachusetts' transportation system represents an irreplaceable asset that shall be maintained by utilizing resources in the most efficient, effective, and safe manner.
- III. The Massachusetts transportation system shall provide increased mobility for people and goods in order to improve quality of life and provide economic advantages.
- IV. The Massachusetts transportation system shall be accessible to all people regardless of personal physical limitations, cost, or attitudinal barriers.
- V. The Massachusetts transportation system shall serve as an engine that enhances the Commonwealth's competitive advantage, promotes economic development, and maximizes employment opportunities.
- VI. The Massachusetts transportation system shall be consistent with the concept of a sustainable society, one in which economic growth and environmental protection work in tandem, residents' quality of life is maintained, and the historic and scenic values that attract visitors to the Commonwealth are preserved.
- VII. The Massachusetts transportation system shall be planned, implemented, and operated in the most cost-effective and efficient manner, and innovative financing strategies shall be utilized to the maximum extent.

CHAPTER 2

POLICIES, GOALS, AND OBJECTIVES

This Chapter presents the goals and objectives derived from the foregoing transportation policy statements. These goals and objectives will guide all transportation planning and implementation activities to ensure that those policies are served and our ultimate mission achieved.

Each of the seven sections of this chapter begins with a statement of one of the transportation policies. Each section then lists specific goals (denoted by capital letters A, B, C, etc.) that need to be accomplished to implement the policy. Each goal, in turn, lists numbered objectives and sub-objectives which refine and focus each goal.

The policies, goals, and objectives summarized in this Chapter will serve as the framework for the development of transportation plans, transportation improvement programs, and planning studies. They will also guide the actions and strategies of all those responsible for transportation system design, construction, operation, and maintenance.

I. INTEGRATED AND COOPERATIVE PLANNING PROCESS

The Massachusetts transportation system shall be the product of an integrated and cooperative planning process that provides extensive opportunities for public participation.

A. Develop a proactive, extensive, inclusive, and ongoing public involvement process.

1. Enhance public involvement by representatives of business and industry, land use interests, financial institutions, public and private transportation providers, and environmental interests through the use of state-wide issue-specific advisory groups such as the Massachusetts Bicycle Advisory Board, the Freight Advisory Council, and the Massachusetts Pedestrian Advisory Board. Additional statewide advisory groups may relate to issues regarding accessibility, the environment, and land use.
2. Maximize the involvement of local government representatives, private citizens, and others by expanding the role of each of the Commonwealth's thirteen regional Transportation Advisory Groups, and by encouraging the development of regular meeting schedules.
3. Develop and implement a proactive public information strategy which includes education and information-dissemination programs, to ensure appropriate demographic representation by individuals and groups not readily served by traditional outreach programs, such as the economically disadvantaged, Indian Tribal Governments, etc.
4. As part of the MPO certification process, conduct reviews of the effectiveness of the public involvement process to ensure that it provides the public with full and open access to the planning process, and that timely revisions of the process are made as a result of that public input.

B. Ensure coordination and cooperation between and among agencies entrusted with the planning, development, and implementation of a balanced statewide transportation system.

1. Create and maintain an ongoing process for collecting, using, and sharing information between and among all agencies involved in the development or implementation of transportation policies, plans, programs, and decisions, perhaps by modifying and expanding the role of the multi-agency Statewide Plan Executive Steering Committee.
2. Develop and employ appropriate mechanisms to address and resolve conflicts, mitigate transportation and/or development impacts, and assimilate divergent opinions in a responsive and inclusionary manner.

- C. Maximize coordination and cooperation between the state agencies and the Commonwealth's thirteen planning regions in the development and implementation of transportation policies, plans, and programs.**
1. Increase State presence and participation at regional Commission meetings, Transportation Advisory Group meetings, and Corridor Advisory Committees
 2. Expand State presence, as appropriate, in the activities of the Massachusetts Association of Regional Planning Agencies and the Massachusetts Association of Regional Transit Authorities.
 3. Ensure the integration of the cooperatively-developed ISTEA Management Systems into the planning process.
- D. Foster coordination and cooperation among states to enhance interstate transportation system efficiency, and to avoid and mitigate any adverse effects of intrastate transportation decisions on neighboring states.**
1. Continue Massachusetts support and participation in interstate programs, such as the New England Transportation Initiative, the I-95 Corridor Coalition, the New England Governors Council, the New England Transportation Consortium, and the Coalition of Northeast Governors.
 2. Ensure that transportation planning and programming decisions are coordinated among the states in those Transportation Management Areas that cross state boundaries.
 3. Develop additional mechanisms, as appropriate, to ensure that plans, initiatives, or current developments in one state are shared with neighboring and/or impacted states, and encourage reciprocity by other states.

II. INFRASTRUCTURE PRESERVATION AND SYSTEM SAFETY

The Massachusetts' transportation system represents an irreplaceable asset that shall be maintained by utilizing resources in the most efficient, effective, and safe manner. Indeed, the safety of the users shall be a primary consideration in the design, development, and operation of the Massachusetts' transportation system.

A. Implement the asset-based ISTEA-mandated management systems to assist decision-makers in selecting cost-effective strategies to protect investments in infrastructure.

1. Coordinate the development of the ISTEA-mandated management systems to ensure compliance with Federal guidelines. Continue the present organizational approach which includes an interagency Management Systems Executive Steering Committee to assure that adequate resources are available for system implementation, and that target dates are met, as well as the Management Systems Technical Coordinating Committee to assure the use of common or coordinated reference systems and methods for data sharing.
2. Implement the Bridge Management System, inspect and rate all highway bridges to insure proper posting and rating, and train all bridge and operation personnel in bridge inspection and construction techniques.
3. Implement the Pavement Management System to inspect and rate all state highways to ensure current data is used in the development of cost-effective rehabilitation strategies.
4. Implement the Public Transportation Facilities Management System, which includes an inventory and assessment of the condition of major transit assets, developing performance standards using life cycle costing, and prioritizing maintenance strategies.
5. Coordinate implementation of the asset-based management systems with implementation of the performance-based management systems — Congestion, Intermodal, and Safety. (Please note that the performance-based management systems are discussed in the appropriate sections of the Goals and Objectives. Also, refer to the Management Systems Issue Paper section of the Plan.)

B. Reduce construction, maintenance, and operation costs through improved design, material selection and performance, and construction techniques.

1. Update design standards to reflect recent technology, materials, and techniques, and to incorporate design features which permit easier maintenance, such as inspection passageways.
2. Coordinate design reviews with maintenance and construction personnel, and emphasize quality assurance during construction.

3. Develop system standards for performance and maintenance and incorporate them into design.
4. Facilitate joint procurement by developing common specifications, and create a system for the sharing/exchange of spare parts; review the status of warranted items before the warrantee expires.
5. Initiate technical training courses for all maintenance staff that emphasizes crossfeed/trend analysis of common maintenance problems.

C. Ensure that safety requirements are considered in the planning, design, construction, and operation of transportation system facilities.

1. Ensure that facility designers are aware of construction safety issues, and are knowledgeable about the special safety needs of particular system users, such as persons with disabilities, pedestrians, bicyclists, truckers, other modes, etc.
2. Provide safety training to field personnel through the use of safety briefings and annual traffic management updates.
3. Conduct ongoing safety inspections of transportation infrastructure, including construction zones, and establish central coordination of timing of concurrent construction projects
4. Conduct safety evaluations of new technology and techniques, such as Intelligent Transportation Systems (ITS).
5. Work with Federal agencies to develop alternative design guidelines that meet safety standards, but are compatible with and preserve the character of rural and historic communities.
6. Ensure highway system safety by implementing the ISTEA-mandated Massachusetts Highway Safety Management System, which includes re-engineering the MHD Accident Record System; coordinating with the Registry of Motor Vehicles on redesigning the Massachusetts Accident Report; developing management support systems for Traffic Control Devices; developing clear safety goals for highway projects; ensuring that safety benefits are factored into the MHD Project Selection Process; and evaluating projects and appurtenances after implementation.

D. Provide education and training to increase public awareness of transportation safety issues.

1. Coordinate safety outreach among transportation providers (MHD, MBTA, MTA, Massport, MAC, etc.), other government agencies (Governors Highway Safety Bureau, RMV, DPU, etc.) and transportation user representatives such as AAA, MMTA, and MRA.

2. Establish a public awareness program for highway safety, particularly as related to construction zones, traffic control devices, accident report preparation, and highway/railway grade crossings.

E. Enhance transit safety and security and improve cooperation between transportation and enforcement agencies.

1. Incorporate current technology into security systems, and develop incident monitoring procedures to identify recurring problems, including trespass and vandalism.
2. Include enforcement agencies in the design review process for transportation facilities.
3. Improve communication between transportation related enforcement agencies and local enforcement agencies.
4. Promote increased presence of transit and local enforcement officials at transit facilities and on transit systems.
5. Establish achievable goals to reduce the number of grade crossing incidents, with particular attention to commuter rail grade crossings, by developing strategic corridor plans to identify crossings targeted for closure, and by expediting current program for installation of traffic warning devices at grade crossings, especially those located along commuter rail lines.
6. Promote increased safety training opportunities for Regional Transit Authorities.

F. Provide increased safety in the movement of Hazardous Materials (HAZMAT).

1. Develop a HAZMAT permitting process to ensure that HAZMAT routes are based on an chemical hazard risk analysis, and that first consideration is given to non-residential routes.
2. Insure that the routing and designation of HAZMAT corridors allows full intermodal access to maritime facilities to insure the flexibility of waterborne transport.
3. Design transportation projects with due consideration of HAZMAT spill contingencies in order to mitigate future impacts.
4. Develop a spill response policy and train appropriate emergency response agencies.
5. Develop and implement a port information system and vessel traffic system (VTS) capable of providing appropriate routing and safety for vessels transporting HAZMAT cargoes.

G. Plan, promote, and provide safe travel for bicyclists and pedestrians, in a manner appropriate for each, and recognizing that bicycling and walking have distinct operational characteristics and safety requirements.

1. Incorporate bicycle and pedestrian safety considerations in the construction and maintenance of transportation facilities, such as roadways, bridges, transit facilities, etc.
2. Implement a bicycle and pedestrian spot/safety program to provide low-cost, small-scale improvements such as railroad crossing repair, drain grate replacement, sidewalk repair, obstruction removal, and pedestrian curb cuts.
3. Develop and implement training and technology transfer programs to promote safer bicycling, such as hosting NHI, FHWA and other federal training sessions on comprehensive bicycle safety programs, or through training programs for local, regional and state personnel on bicycling safety design and operation, through the BayState Roads Program and other appropriate mechanisms.

H. Seek to improve safety and maintain clear airspace at public use airports.

1. Develop, maintain, and enforce comprehensive statewide safety guidelines for public use airports by thoroughly reviewing and updating Commonwealth of Massachusetts Aeronautical Regulations, developing minimum standards for airport safety regulations and for aeronautical operations conducted at public use airports.
2. Adopt new safety technologies where appropriate, such as the installation of Global Positioning System (GPS) navigational aids, automated weather observation systems, and new and expanded sign, lighting, and sensor devices, and promote development of Category I and Category II GPS technology.
3. Remove all vegetation that obstructs airspace protected by federal or state regulations by developing a comprehensive Vegetation Management Plan for each public use airport.

III. MOBILITY FOR SYSTEM USERS

improvements may be derived by fostering intermodal connections, encouraging the use of advanced technology, optimizing the operation of existing systems, reducing the demand for travel, encouraging the use of alternative modes, and by providing prudent system capacity increases.

A. Expand mobility by ensuring full and formal consideration of intermodal connections in transportation policy formulation, planning, design, and funding at all levels.

1. Formalize the planning and evaluation of intermodal needs and performance as a discrete activity integrated within the transportation planning process at the state and regional level, including programs involving EOTC, Massport, MBTA, MHD, MTA, etc. This can be fostered through the implementation of the ISTEA Management Systems, particularly the Intermodal Management System and the Congestion Management System (see the other sections of these Goals and Policies regarding implementation of these systems, as well as the Management Systems Issue Paper section of the Plan).
2. Design intermodal transportation programs and prioritize transportation investments to be supportive of commerce and economic development.
3. Assure the greatest possible physical integration of intermodal connections by coordinating the planning and design of transportation services and facilities for different modes with an eye toward creating natural opportunities for mode transfer points within transportation corridors.
4. Assure the greatest feasible operational integration of intermodal connections by coordinating schedules within modes and among service providers, and by encouraging service vendors to coordinate hours and days of service to more completely accommodate mode transfer travel requirements.
5. Assure the greatest feasible institutional integration of intermodal connections by coordinating schedules, fares, the availability of transfers, transfer costs, etc., among all modes, including the services and facilities offered by both the public and private sectors.
6. Facilitate the mobility of all intermodal transfer system users by minimizing distances and grade changes at intermodal transportation facilities, particularly for those facilities heavily used by persons with carry-on bags or families with children/strollers, elderly, and disabled etc., and by providing complete schedules, routes and fare information at mode interchange points.
7. Select locations for transportation terminals, transportation centers, and parking lots that can simultaneously accommodate multiple access modes and facilitate mode

transfers, while protecting the quality of life in communities and neighborhoods where facilities are located.

B. Encourage the application of advanced technologies where measurable gains may be realized to improve safety, reduce congestion, increase mobility, reduce environmental impacts, improve energy efficiency, and improve economic efficiency.

1. Develop a Statewide Strategic Plan for the integration of advanced technologies into the existing transportation system and the planning for transportation improvements.
 - a. Establish an interagency, intermodal advanced technology advisory committee under the auspices of the Executive Office of Transportation and Construction.
 - b. Using the management systems process, identify communication, data collection, data management, and data dissemination needs. Establish working subcommittees as needed to focus on specific subject areas such as communications, surveillance, mapping, etc.
 - c. Continue to implement the strategic planning process that was initiated during the development of the Metropolitan Boston ITS Strategic Plan throughout the remainder of the State. Develop appropriate work plans for consultant services.
 - d. Establish through use of agency personnel, academic leaders and private sector experts, criteria or measures of effectiveness to evaluate those technologies which should be incorporated into the transportation planning process.
2. Educate, advise and inform transportation professionals on the benefits of incorporating advanced technologies into solutions to transportation problems.
 - a. Establish educational, informational and training outreach programs with the regional planning agencies and municipal agencies on advanced technologies and the potential benefits to transportation planning. These efforts should be included as a subset of larger planning efforts associated with the development of regional transportation plans.
 - b. Actively participate in the development of advanced technologies for transportation planning through regional and national forums such as ITS America , the I-95 Corridor Coalition, and other associations.
3. Implement advanced technology applications and system integration through alternative public/private partnering arrangements.
 - a. Provide a forum, in cooperation with the Executive Office of Economic Affairs, for the exchange of information on available technologies developed by the private sector and the needs of transportation professionals in developing a fully integrated transportation system.

- b. Identify and aggressively pursue options for the deployment of demonstration projects and operational tests as test beds for the application of advanced technologies. Establish partnership/private sponsorship of projects as a means of testing applications and as potential funding sources.
 4. Establish standards that encourage an open architecture to foster interagency compatibility and improve effectiveness by eliminating duplicate, redundant or competing systems.
- C. Implement Transportation System Management strategies to increase mobility by optimizing the operation of existing transportation systems through the use of non-capital-intensive techniques.**
1. Manage highway traffic congestion by utilizing freeway surveillance and control systems, incident management, ramp metering, High Occupancy Vehicle (HOV) treatments, and Advanced Traveler Information Systems (ATIS).
 - a. Implement the Metropolitan Boston IVHS Strategic Deployment Plan, which includes projects such as the I-93 Smart Corridor Project.
 - b. Plan and implement various HOV projects, such as the Southeast Expressway HOV Lane Project, and develop an HOV System Plan.
 - c. Continue the deployment of the Motorist Assistance Program, and expand the Statewide Incident Response program.
 - d. Proceed, through the multi-agency Traffic Management Team (TMT), with a more comprehensive, proactive form of incident management, including a more detailed examination of incident scene operational issues.
 - e. Expand the current I-93 Incident Response Van Pilot Project across the Commonwealth, and coordinate and supervise the Motorist Assistance Program. In addition, the Incident Response vans will coordinate inter-agency emergency response efforts.
 - f. Complete current Advanced Traveler Information Systems demonstration projects, and conduct project evaluations.
 2. Improve arterial traffic flow through the use of access management, channelization, signal timing, integrated traffic management systems, and parking restrictions and enforcement.
 3. Utilize low-capital-intensive transit strategies to improve transit system performance and encourage modal shifts.
 - a. Incorporate advanced public transportation technology into transit systems to improve efficiency.

- b. Improve rail signal systems to allow operation at higher speeds and more frequent headways.
 - c. Develop priority bus lanes, traffic signal preemption, and timed transfer strategies to reduce delays and congestion for individual buses and trains.
 - d. Plan and implement improved transit services to serve low density suburban and rural areas with connections to regional bus and commuter rail services.
 - e. Increase the quality and number of bus shelters throughout the state.
- 4. Increase the fringe parking supply to facilitate parking of single-occupant vehicles and transfer to HOVs and transit services by providing 20,000 additional parking spaces at park-and-ride lots in the Boston metropolitan region by the year 2000, and appropriate parking expansions in other regions.
 - 5. Incorporate site-specific design treatments to encourage alternative mode usage, such as clustering of buildings, incorporation of transit-oriented design features (shelters, bus pullouts, etc.), sidewalk improvements, bicycle storage facilities, and provision of shower/locker facilities.

D. Encourage the use of Transportation Demand Management (TDM) strategies to reduce the demand for services by encouraging the use of alternative modes and by providing substitutes for travel.

- 1. Provide area-wide ridesharing initiatives to promote and assist commuters through state and regional incentives to share rides in private cars (carpools) or vanpools.
- 2. Implement employer-based transportation management programs to assist employees in making commute and travel choices.
 - a. Offer assistance to employers in developing innovative solutions to corporate transportation needs, such as shuttle services, guaranteed ride home programs, and transportation allowances.
 - b. Assist the business community to organize, initiate, and operate private Transportation Management Associations (TMAs) and transportation centers.
 - c. Encourage employer subsidized transit pass programs as provided through the National Energy Conservation Act of 1992 (which expands employer pass benefits up to \$60 per month), and fund marketing programs.
- 3. Encourage work schedule and location changes to reduce commute travel or shift it to off-peak periods, such as flexible work hours, compressed work weeks, staggered work hours, and telecommuting.

4. Develop parking management strategies to encourage shifts to non-auto modes, such as preferential parking programs for HOVs, and modified parking fee structures, and bicycle parking facilities.
 5. Improve the marketing of available alternative services at employment centers to encourage the use of non-auto modes.
 6. Involve Regional Transit Authorities in planning and implementing targeted and area-wide TDM programs
 7. Incorporate transportation demand management strategies through the permitting and MEPA process, including the use of Section 61 findings.
- E. Plan and implement prudent system capacity increases to alleviate congestion, provided that all appropriate alternatives are evaluated, and, in regions designated as Transportation Management Areas, are the product of an approved Congestion Management System (CMS).**
1. Implement ISTEA-required regional Congestion Management Systems that meet Federal requirements within the required time frame.
 2. Develop criteria and guidelines with FTA and FHWA to conduct Major Metropolitan Investment and Corridor Studies.
 3. Complete currently planned major transportation projects, such as the Central Artery/Third Harbor Tunnel Project, Route 146 Worcester, Northeast Corridor Improvement Project, Logan Airport Modernization, and the Old Colony Restoration Project.
 4. Implement the recommendations of the Program for Mass Transportation.
- F. Provide bicycle and pedestrian facilities to encourage bicycle and pedestrian travel as viable transportation modes.**
1. Adopt a Statewide Bicycle Policy to support and promote the safe use of bicycles in the Commonwealth, and develop a Statewide Bicycle System Plan.
 2. Adopt a Statewide Pedestrian Policy to support and promote safe walking in the Commonwealth, and develop a Statewide Pedestrian System Plan.
 3. Make bicycle and pedestrian facilities an integral part of the highway system by designing, constructing, reconstructing and maintaining roadway projects and bridges to safely accommodate bicyclists and pedestrians.
 - a. Revise the Mass Highway Design Manual, and other applicable state, regional and local design and operation manuals, to more fully incorporate state-of-the-practice bicycling and pedestrian elements.

- b. Implement traffic calming programs which promote safer bicycling and walking by reducing motor vehicular speed and volume.
- 4. Develop a comprehensive and coordinated off-highway system of bicycle and pedestrian facilities by designing, constructing, reconstructing, and maintaining bike and pedestrian paths and multi-use off-road trails, such as rail-trails and trails on utility rights-of-way, and by protecting the integrity of abandoned railroad rights-of-way for potential reuse as multi-use trails.
- 5. Provide bicyclist and pedestrian access to and within park-and-ride facilities, and transit, passenger rail, bus, ferry and air terminals, and provide secure bicycle parking at these locations.
- 6. Provide safe and convenient bicycle conveyance aboard transit, passenger rail, buses, ferries and airplanes.
- 7. Plan, provide, and promote safe travel by bicyclists and pedestrians through local, regional and state land use policies, plans, and projects.
 - a. Incorporate bicyclist and pedestrian access and safety through the MEPA process, in site plans and designs for such facilities as employment centers, shopping malls, schools, and residential developments.
 - b. Incorporate bicyclist and pedestrian access and safety through zoning, master plans and other appropriate local, regional, and state mechanisms.

G. Improve intercity passenger rail and bus transportation.

- 1. Develop marketing initiatives to improve passenger awareness of interregional transportation choices, such as the production of an inter-regional map and related information detailing intermodal connections in Massachusetts and adjoining states.
- 2. Coordinate services provided by regional transit operators within Massachusetts and with adjoining states, and develop a statewide system of passenger intermodal transportation centers.
- 3. Support high-speed passenger rail service in the Northeast Corridor, and investigate the appropriate role for high-speed rail in other Massachusetts corridors.
- 4. Coordinate the electrification of passenger rights-of-way and the development of high-speed rail rights-of-way with existing and future freight operations, insuring that infrastructure projects for passenger or freight do not preclude future improvements for one another.

H. Improve passenger aviation system performance.

1. Develop short and long range capital improvement investment plans that are the result of a determination of current and potential capacity and demand levels, and that direct expenditures to airports are made on the basis of economic impact, safety, environmental protection, and system preservation.
2. Seek to improve utilization of existing regional airports in lieu of construction of a second major airport to service existing regional demand and to offset future demand in excess of capacity at Logan International Airport.
3. Continue implementation of Massport's Logan 2000 Program to restructure Logan Airport access and terminal facilities to accommodate future growth, and Massport's Intermodal Passenger Transfer System, a people-mover connecting the Airport MBTA Station with all airport terminals.

IV. TRANSPORTATION SYSTEM ACCESS

The Massachusetts transportation system shall be accessible all people regardless of personal physical limitations, cost, or attitudinal barriers. The Americans with Disabilities Act (ADA) provides comprehensive civil rights protections to individuals with disabilities in the areas of employment, public accommodations, state and local government services, and telecommunications.

A. Remove existing impediments to total accessibility by renovating existing facilities and incorporate accessibility standards into new construction.

1. Comply with the standards set by the Architectural and Transportation Barriers Compliance Board, the Massachusetts Architectural Access Board and the Americans with Disabilities Act Accessibility Guidelines.
2. Implement Key Station Plans in a timely fashion. Key Stations have been designated by transit authorities as those rail stations which qualify under criteria set under ADA.
3. Improve access to facilities along State Highways including rest areas, tourist information facilities, and Park-and-Ride facilities.
4. Create key access highway corridors to promote travel within the Commonwealth and to neighboring states.
5. Promote awareness and the necessity of providing a minimum level of accessibility features at each site, including at least one completely accessible route. For example, an accessible route may be provided by utilizing accessible public transit stops, parking spaces, passenger loading zones, and public streets and sidewalks. other useful features relate to signals and signs, curb ramps, etc.

B. Design and purchase only those vehicles which are accessible to people with disabilities and retrofit existing vehicles so they are accessible to people with disabilities.

1. Purchase only accessible vehicles including buses, light and heavy rail vehicles, and trackless trolleys.
2. Comply with the one-car-per-train rule of ADA which states that at least one-car-per-train shall be made accessible to people with disabilities through either a new car purchase or retrofit program.

C. Implement ADA Complementary Paratransit Plans. At a minimum this includes the following standards:

1. Provide complementary paratransit service along at least a 3/4 mile corridor around a fixed route bus or a radius around a rail station.
 2. Expand service days and hours on paratransit service to meet those of fixed route.
 3. Charge no more than twice the fixed route fare for a comparable fixed route trip.
 4. Provide next-day complementary paratransit service.
 5. Prohibit capacity constraints such as waiting lists or restrictions on number of trips allowed or prioritization based on trip purpose.
- D. Train all employees dealing with the general public regarding awareness of people with disabilities through sensitivity and passenger assistance training sessions, and, where appropriate, in the use of equipment used by people with disabilities.**
1. Utilize the disability community for the formation of advisory groups which can identify effective solutions to accessibility problems.
 2. Develop a statewide advisory group to improve coordination between state and local agencies (including both transportation and human service agencies) in providing services to the disabled community (this group can also be used in the Mobility Assistance Program).
 3. Advertise reduced transit fares available to the elderly, people with disabilities, students, children, or other special interest groups. The Statewide Access Pass is a reduced fare pass offered to people with disabilities for use on Massachusetts transit authorities.
 4. Provide all public documents in accessible formats as requested including, Braille, large print, audio tape, and computer disk.
 5. Choose only accessible meeting sites and provide a sign language interpreter at all meetings.
 6. Train personnel in the importance of maintaining building access to assure that ramps, lifts, curb cuts, elevators, etc., are all properly maintained. It does little good to have a ramp if it is blocked by snow, or if accessible entrances are locked.

- E. Encourage coordination among transit authorities and local communities for both fixed route and paratransit services to accommodate people with disabilities traveling within and over transit authority boundaries.**
1. Advertise accessible fixed route and paratransit services and fares offered through media such as newspapers, radio, television, and disability newsletters.
 2. Develop public awareness and support for accessibility projects through marketing and public processes.
 3. Encourage local communities to work in a cooperative effort to develop accessibility standards, to assign responsibilities, and to identify funding sources.
- F. Encourage public and private non-profit providers of paratransit service to participate in the coordination of services through the Mobility Assistance Program.**
1. Advertise the Mobility Assistance Program and accept requests for mailing list additions.
 2. Screen applicants for service provided to elderly and people with disabilities, and for a cooperative and supportive relationship with the local regional transit authority.
 3. Develop a statewide advisory group to improve coordination between state and local agencies, including both transit and human service agencies, providing services to the disability community (this group can also be used for transit authority staff).

V. ECONOMIC DEVELOPMENT

The Massachusetts transportation system shall serve as an engine that enhances the Commonwealth's competitive advantage, promotes economic development, and maximizes employment opportunities. This can be accomplished by creating a strong transportation infrastructure to support industry, attract growth, and position the Commonwealth prominently in the global marketplace.

- A. Determine which potential transportation projects and services will have the greatest impact on productivity and job growth, and give full consideration to those projects in the capital funding process.
 - 1. Establish methods to determine which projects will have a high permanent economic or employment impact (as opposed to temporary construction impact) by researching available methodologies for determining permanent economic impacts resulting from transportation investments, and by possibly requiring economic impact statements for proposed transportation projects to estimate permanent as well as temporary economic impact.
 - 2. Conduct an ongoing assessment of which corridors, regions, facilities, and services will most encourage economic growth and business development. This can be accomplished by conducting meetings with statewide industry groups and regional business representatives to determine industry's state and regional transportation needs and define solutions that provide the greatest economic impact, and by coordinating transportation planning with the State's economic strategy as outlined in *Choosing to Compete*.
 - 3. Build into the transportation capital planning process a means to consider investment in projects with high permanent employment or economic impacts, but which reflect regional differences and do not disadvantage rural communities.
 - 4. Site transportation-related facilities such as transportation agency offices in economic nodes of cities and other compact urbanized areas.
 - 5. Encourage transportation operators to include local, regional and state economic recovery/business development agencies and organizations in their planning process.
- B. Quickly respond to opportunities for private economic investment through rapid funding of necessary transportation infrastructure associated with major development projects.
 - 1. Establish and maintain adequate funding of the Public Works Economic Development (PWED) grant program, which allows rapid funding of infrastructure directly associated with job-creating economic development projects.

2. Ensure the largest economic impact and largest leveraging of other private and public resources in the use of PWED and other transportation funds.
 - a. Establish a grants process that gives priority use of PWED funds to projects with greatest permanent economic impact and greatest private investment.
 - b. Coordinate use of PWED and other transportation funds with other federal and State infrastructure funds such as the Economic Development Administration's Public Works grants and the Executive Office of Communities and Development's Community Development Action Grant (CDAG) program, as well as with investments from the Commonwealth's Quasi-public agencies.
- C. **Utilize transportation planning and investment decisions to assist disadvantaged areas and Minority/Women Business Enterprises.**
 1. Assess and address the transportation needs of disadvantaged areas targeted for development, particularly of State-designated Economic Opportunity Areas and federally-designated Empowerment Zones and Enterprise Communities, by committing PWED funds to support projects within State-designated Economic Opportunity Areas and federally-designated Empowerment Zones and Enterprise Communities.
 2. Determine long-term transportation projects with the greatest positive economic and social impact on disadvantaged areas, with particular efforts made to assist projects that include minority and women-owned business enterprises.
- D. **Improve the efficiency of the freight system and improve urban and rural goods movement to reduce costs for freight system users, and to foster increased international trade.**
 1. Develop and implement the Intermodal Management System (IMS) to improve freight system performance. The IMS will systematize freight system data analysis, needs identification, and strategy identification and evaluation in order to provide a framework for decision makers to choose among competing projects and strategies.
 2. Develop appropriate linkages between the IMS and other management systems to ensure that freight issues are considered. For example, the Bridge Management System should identify bridges with limited rail clearances so that prioritization can be given to developing potential double-stack routes.
 3. Develop the Freight Advisory Council so that freight transportation users and providers assist in the identification of needs and have full access to the transportation planning and project implementation process.
 4. Continue development of the Massachusetts Double-Stack Initiative.

5. Continue to conduct special studies related to freight movement, such as those related to the capacity of current freight intermodal facilities such as Ft. Devens Terminal, Port of Worcester, etc., for expansion potential; and the establishment of a dedicated priority route for international land bridge, mini-land bridge, and micro-land bridge freight routes.
6. Insure freight rights-of-way are maintained in appropriate corridors to provide access to seaport facilities and intermodal terminals.
 - a. Secure waterborne vessel access, including channel width, vertical clearance, dredging depths, and berthing locations, by insuring there is not infringement by shoreside improvements such as piers, bridges, electric power lines, etc.
 - b. Protect existing and potential waterside facilities, including potential passenger terminal piers and commercial vessel berths, and access routes to these facilities such as rail spurs near marine terminals, transit access to water/taxi berths, etc.
 - c. Preserve potential access routes for construction of an off-shore oil terminal, accounting for terminal location, pipeline routes, and access to existing storage facilities adjoining Chelsea Creek and the Mystic River.

E. Consider the unique needs of Massachusetts' travel and tourism industry in the development of the transportation system.

1. Improve access to tourism and travel facilities and attractions through better intermodal links, and specific targeted investments.
 - a. Explore the potential for implementation of intermodal links that allow travel to key tourist destinations by means of transit, such as the Hyannis intermodal terminal.
 - b. Continue to develop coastal access, combining roadways, bikeways, walkways and docking facilities to link attractions along the Massachusetts coastline.
 - c. Continue to develop additional safe bike and pedestrian trails.
2. Encourage development of intermodal facilities that enhance the attraction of Massachusetts to both cruise ships and to dedicated "cruise-ferry" vessels carrying freight and passengers to nearby Canadian locations such as Nova Scotia.
3. Ensure that the planning process recognizes that, in many cases, a scenic right of way is itself an important attraction whose character should be maintained.
4. Maintain clean, safe, accessible, and convenient restroom facilities and build additional facilities where needed, in adequate numbers on major highways, particularly on routes heavily used by tourists..

5. Develop and maintain clean, safe, accessible, and convenient Visitor Centers at or near all key entry locations to Massachusetts and on important tourist routes, with restroom facilities and security systems.
6. Provide better travel information for tourists, by developing cross-marketing for other state sites and attractions, by providing improved transportation maps, and by utilizing computerized travel and tourism information systems, such as the Massachusetts Turnpike Authority's project to create interactive kiosks for information centers along the Turnpike.
7. Develop more comprehensive and clearer signs for tourist-related attractions, information centers, and businesses that are understandable to foreign visitors by continuing communications with MOTT, EOTC, and the Regional Tourist Councils.
8. Make Logan Airport more visitor-friendly, with an emphasis on the needs of international visitors.

VI. ENVIRONMENT, LAND USE, AND QUALITY OF LIFE

The Massachusetts transportation system shall be consistent with the concept of a sustainable society, one in which economic growth and environmental protection work in tandem, residents' quality of life is maintained, and the historic and scenic values that attract visitors to the Commonwealth are preserved.

- A. Ensure that the transportation sector does its fair share in achieving reductions in emissions and precursors of air pollutants to provide a healthier environment for the Commonwealth's citizens and visitors.
1. Vigorously implement all mobile source emission control measures included in the State Implementation Plan for Clean Air, and related transportation agency activities, to achieve or exceed projected reduction levels.
 2. Provide guidance and technical assistance to ensure that regional transportation plans and transportation improvement programs conform to the State Implementation Plan.
 3. Encourage research and technology development to find new solutions to air pollution problems created by motor vehicles, including vehicle and power train innovations and alternative fuels. (See following section on alternative fuels.)
 4. Reform inspection and vehicle maintenance and repair activities to accomplish a cleaner fleet of vehicles in the state and the elimination of grossly polluting vehicles.
 - a. Support the implementation of a new vehicle inspection and maintenance program that will include thorough testing of the performance of motor vehicles in a simulated driving cycle.
 - b. Support the development of a program to remove the most grossly polluting vehicles from the vehicle fleet through an emissions trading and banking program.
 - c. Update policies and practices of transportation agencies that control vehicle fleets to improve emission characteristics, such as improved maintenance practices and vehicle modifications.
 5. Encourage and support non-polluting modes of transportation, such as bicycling, walking, and other non-motorized forms of transport, as described in the Bicycle and Pedestrian component of these Goals and objectives.
 6. Encourage travelers to utilize, to the extent feasible, modes of transportation that produce the least pollution per passenger mile consistent with their trip purpose, travel distance, and personal needs, as discussed in the Travel Demand Management component of these Goals and objectives.

B. Reinforce the objectives of the Massachusetts Energy Plan to achieve a long-term reduction in energy consumed by the movement of people and goods, and to increase energy supply security.

1. Stimulate the market for alternative-fuel vehicles.
 - a. Continue, in a cooperative venture with the Division of Energy Resources, an Electric Vehicle Pilot Program to test and evaluate 50 electric powered vehicles in a real world setting over a multi-year period.
 - b. Sponsor and fund a study to determine the relative safety of alternative fuel vehicles, particularly compressed natural gas (CNG), liquefied natural gas (LNG), and propane in tunnels and roadway underpasses.
 - c. Conduct alternative fuel demonstration and research programs, such as an Alternate Fuel Transit Van Program, and trials of bi-fuel pick-up trucks.
 - d. Assist in the development of an expanded refueling infrastructure for alternative fuels, such as natural gas, CNG, and recharging facilities for electric vehicles.
 - e. At a minimum, comply with the alternative fuel vehicle purchase requirements of the National Energy Policy Act of 1992.
2. Participate in the Clean Cities Initiative, sponsored by the U.S. Department of Energy, which is intended to gather together stakeholders interested in diversifying energy resources and facilitating the expansion of use of alternative fuels.
3. Implement an alternative fuel program among the Commonwealth's Regional Transit Agencies by continuing and evaluating the Alternative Fuel Demonstration Program.
4. Elevate the priority of energy use in transportation planning and investment by incorporating energy impacts in transportation decision making.

C. Minimize the impact of transportation projects and strategies on the Commonwealth's water supply by avoiding projects that affect water resources, minimizing impacts when they are unavoidable, and mitigating impacts where they occur.

1. Adopt and implement Best Management Practices for construction and maintenance of highways and other transportation facilities which address stormwater management, including oil-water separation systems, sedimentation basins, filtration, and attenuation of runoff flow.
2. Commission a study of sites across the state where highways and related facilities may impact the habitats of rare, protected, or endangered species.
3. Commission a technical analysis of a limited access highway on a coastal area ecosystem.

4. Complete a program of testing and removal of old or leaking underground fuel storage tanks at state transportation facilities.
5. Set up a stormwater runoff attenuation demonstration to bring polluted shellfish beds back to health.

D. Implement the recommendations of the transportation agencies' and authorities' Pollution Prevention and Resource Conservation Plans, prepared under the Clean State Initiative, Executive Order #350 as an example for other state agencies and the private sector to follow.

1. Reduce the amount and toxicity of hazardous substances used, increase the proportion of recycled and other environmentally preferred materials procured, and increase the rate at which waste materials of transportation operations are recycled.
2. Conduct energy audits and energy conservation programs to reduce the amount of energy used for space heating and cooling in buildings used by transportation agencies, roadway lighting, and other operational energy uses.
3. Institute Best Management Practices for transportation construction and maintenance projects and programs.

E. Avoid, minimize, and mitigate noise and vibration impacts caused by transportation projects and facilities.

1. Support measures to reduce noise and vibration emanating from vehicles, such as accelerated conversion of aircraft fleets to Phase III type planes, expansion of the number of electrically powered vehicles, and improved maintenance of state vehicles and railroad track beds.
2. Determine the effectiveness of physical containment, absorption, or reflection of noise generated by transportation facilities and vehicles by reviewing noise barrier technology for application along highways, and developing specifications for noise control applications.
3. Undertake improvements to dampen noise and vibration caused by transportation facilities by installing barriers where noise levels are excessive, constructing other facilities and improvements that attenuate or reduce the impact of excessive noise, installing vibration absorbing pads or layers during rail bed construction, and improving or eliminating at-grade rail crossings.

- F. Strengthen the transportation infrastructure of cities and other established economic development centers to avoid extending new highway infrastructure into undeveloped or environmentally sensitive areas, and to provide the widest feasible choice of transportation alternatives for residents, visitors, and businesses in order to encourage and support a rational, economically efficient, and environmentally sensitive pattern of land use.**
1. Support the economic reinvigoration of the state's cities, urbanized areas, and "economic opportunity zones" through targeted transportation infrastructure investments, use of currently underutilized infrastructure, and broad-based transportation planning activities.
 2. Adjust and improve transportation services in areas of economic concentration, thereby encouraging more extensive use of energy-efficient modes of transportation and attracting higher densities.
 3. Preserve and enhance sensitive natural resources through the implementation of an open space acquisition program that includes data collection, coordinated planning, and project reviews; and, that works cooperatively with land trusts, conservation commissions, and other state agencies.
- G. Direct investment toward transportation facilities that are well designed and achieve broad and long-lasting benefits for residents, employers, and visitors.**
1. Create a Scenic Byways Task Force to develop a Scenic Byway Program to protect and promote designated roads within the Commonwealth, in accordance with goals established by the FHWA Scenic Byway Advisory Committee, and complete two current Interim Scenic Byway Studies: The Old King's Highway (Route 6A); and, the Jacob's Ladder Trail (Route 20). Also, develop alternative design standards for scenic and rural roads that may not qualify for Scenic Byway designation, but that are scenically important.
 2. Implement the Transportation Enhancement Program through the development of guidelines for project selection and administration in order to assure that the highest quality projects are selected throughout the Commonwealth, and that enhancement projects are completed according to specifications.
 3. Participate with local, regional, and state agencies and authorities in the protection and restoration of historic and architecturally significant land and properties, particularly those that relate to historic transportation activity or are located near current or proposed transportation uses.
 4. Encourage transit- and alternative-mode-friendly site design, such as the inclusion of transit facilities, provision of locker rooms, use of joint development, in order to maximize alternative mode usage.

5. Develop well designed transportation projects that minimize impacts to the environment and to the quality of life of those living and working nearby. For example, the Central Artery/Third Harbor Tunnel Project. This project will not only resolve numerous transportation problems, it will also remove a physical barrier between the center of the city and the waterfront, provide new open space at the surface level, and support extensive improvements to the Charles River and its banks. Also, the new Route 146 between downtown Worcester and a new interchange with the Massachusetts Turnpike will resolve an important gap in the highway system, but it will provide Worcester with greatly improved access to eastern Massachusetts and Rhode Island. This project also includes a major bikeway segment that will parallel Route 146 and become a part of the Blackstone River Valley National Heritage Corridor bikeway between Providence and Worcester. The landscape design of this project is expected to set a new standard of quality.

VII. COST EFFECTIVENESS AND FINANCING

The Massachusetts transportation system will be planned, implemented, and operated in the most cost-effective and efficient manner, and innovative financing strategies shall be utilized to the maximum extent.

A. Improve transportation agency efficiency and effectiveness.

1. Create a Massachusetts Department of Transportation so that the transportation agency organizational structure reflects present-day needs for developing an effective, efficient, and coordinated approach to implementing a multimodal transportation system.
2. Initiate and continue strategic planning processes to ensure that all transportation agencies are clear on "what it is we are trying to do and achieve," that management is more alert to change and new opportunities, that decisions are made in a coordinated manner, and that management develops a more proactive posture.
3. Ensure that the transportation agencies develop strategic approaches to the application of information technology in order to increase operational cost effectiveness.
4. Involve employee representatives in the development of transportation agency policies and procedures.
5. Develop strategy-supportive organizational performance by structuring incentives to induce commitment to agency goals, to reward better performance, and to foster an innovative organizational culture.

B. Expand the use of private contractors in service delivery.

1. Encourage employees of transportation agencies to compete with private contractors in bidding on contracts for service delivery.
2. Improve management of private contracts by requiring managers to perform cost analysis prior to contracting a service.
3. Expand contracting out to include the privatization of certain management functions.

C. Develop policies and initiatives that will reduce the amount of time that is currently required for project development, and that will improve the quality of project designs, resulting in fewer construction delays and cost overruns in the field.

1. Improve transportation agency capability for in-house engineering and environmental work.
 - a. Re-examine entire design/review process to determine causes of persistent bottlenecks (e.g. human resource, policy or statutory requirements).
 - b. Refine/improve project tracking systems to better meet needs of users.
 - c. Evaluate problems in the field (e.g. overruns, extra work orders) attributable to design error or oversight, in order to learn from mistakes and rate the quality of consultants' designs.
2. Improve agency capability to review consultant designs by evaluating consultants' progress and quality of work more closely and regularly, rather than just one evaluation at the end of the project.
3. Utilize more efficient contracting processes to reduce project development time.
 - a. Streamline process (from consultant selection to design contract award) and review statutory/policy constraints which delay the timely utilization of outside consultants.
 - b. Develop innovative contractual arrangements (i.e. incentives) to stimulate early completion and cost-savings proposals in design and engineering contracts, and pursue a more aggressive utilization of open-ended and multi-assignment design contracts.
4. Reduce the time needed for environmental approval through continued early coordination with local, regional, state, and federal environmental agencies
 - a. Foster partnering concepts with environmental regulatory agencies to consolidate and streamline permit processes in areas of regulatory overlap.
 - b. Develop an Environmental Manual as a complement to the MHD Design Manual to incorporate the integration of environmental considerations from project development through construction and maintenance.
 - c. Provide on-going training to appropriate agency divisions and districts on environmental policies, processes and regulations.
 - d. Develop and issue Fact Sheets for design and construction personnel identifying appropriate technologies, methodologies, and best management practices to insure proper adherence to environmental regulations and permits.

- g. Develop standard specifications for construction contracts in areas identified by environmental regulatory agencies as on-going compliance problems.

D. Encourage private sector investment in transportation infrastructure.

- 1. Identify methods to provide incentives for private investment in transportation infrastructure, and support legislation to provide for greater involvement and investment from the private sector (e.g. leasing of public facilities, air/ground rights transfers, turnkey initiatives, and public/private development opportunities).
- 2. Pass legislation allowing for the design and construction of projects in one phase by the same contractor; design/build is more cost-effective and brings projects on line more quickly.

E. Develop funding strategies to optimize efficient use of all available funding sources for transportation.

- 1. Maximize the State's availability and utilization of Federal funds for transportation.
 - a. Effectively utilize all federal funds currently available to Massachusetts.
 - b. Proactively solicit Congress to make available previously apportioned federal funds.
 - c. Pursue phased obligations for major/multi-year federally aided projects.
- 2. Develop/maintain policies that will ensure an efficient, well-balanced use of state funds for transportation.
 - a. Maintain a stable state revenue flow for transportation (adjusted for inflation) in order to facilitate long term capital planning.
 - b. Maintain gas tax funding for mass transit and explore efficiencies of synchronizing activities of the MBTA and the regional transit agencies.
 - c. Start the process for the development of a forward funding plan for the MBTA and the 14 Regional Transit Authorities.

3. Explore all available options for creative financing of new major projects in Massachusetts.
 - a. Consolidate major metropolitan Boston highways into a single transportation system (i.e., the Metropolitan Highway System, including the Central Artery, Ted Williams Tunnel, Tobin Bridge, Callahan/Summner Tunnels and I-90 Boston Extension) in order to coordinate pricing strategies and fund the construction, operation and maintenance of the system as a whole.
 - b. Explore the use of joint ventures with private industry in connection with interstate rest areas and intermodal transportation centers.
 - c. Consider developing a Revolving Loan Fund (would need to be tied to a toll facility or another revenue producing facility, such as lease payments from a rest area).
 - d. Explore partnerships with other state agencies (e.g., Mass. Land Bank).

CHAPTER 3

MOVING FORWARD

A GLIMPSE OF THE FUTURE

It's 10:30 on a Friday morning in the year 2020. Passengers from Washington, D.C. have just disembarked at Logan Airport's reconstructed Terminal A. Two business partners returning from meetings in the Capitol are heading home. To reach his home on the South Shore one partner has decided to take the ferry directly from Terminal A to the Ferry Terminal in Hingham. The other has opted for the shuttle bus to South Station via the Ted Williams Tunnel where a high-speed train will take him to the Worcester Intermodal Transportation Center where his wife will pick him up in their new electric car.

Outside South Station bicyclists, joggers and walkers move briskly along the tree lined boulevards and park-land above the underground Central Artery. The October air is crisp and clean. A pedestrian pauses to admire a cardinal in a nearby tree. While still in the heart of a major metropolitan area, the park-land over the Central Artery is quiet enough to hear the bird sing. Meanwhile, 100 feet below, a motorist headed to Albany has just received information from the ITS system installed throughout the underground Central Artery that I-90 is trouble-free to the New York border.

It's 11:00 AM. The morning commute on the Southeast Expressway is winding down. A bus driver taking school children from Plymouth to the Science Museum for an 11:30 presentation saves time by taking the HOV lane from Braintree to the Central Artery. In the afternoon the traffic flow will be reversed to accommodate southbound High Occupancy Vehicles (HOVs). The kids from Plymouth will be back in time to participate in after school activities.

A veteran trucker, west-bound on the Turnpike with a load of building materials, is headed for the Worcester exit at the interchange with Routes 146 and 20 in Millbury. She remembers the extra time involved in reaching Worcester before this interchange opened and is pleased with the savings in time and money. A recent trip to Plymouth was made much shorter by taking Route 44 from I-495 than it used to be by traveling into Boston and then heading South on the South East Expressway. As a professional driver she hauls loads to all parts of Massachusetts; the investments made to the highway system over the past 25 years make her job much easier now.

BACK TO THE PRESENT

The investments we make in our Transportation System today will pay dividends decades from now, transforming this glimpse of the future into reality. The Commonwealth of Massachusetts must vigorously implement the policies and goals outlined in Chapter Two. The projects and strategies derived from these policies will advance through the planning process and must be developed cooperatively by the Commonwealth and the Regional Planning Agencies after extensive input from the public. Our transportation future is taking shape today. It will be shaped by those projects and programs currently underway and by those being planned.

The criteria for project selection must be compatible with the principles set forth in the mission statement (Chapter 1) of **Accessing the Future**. Transportation projects must enhance mobility, promote economic growth and protect our environment and quality of life. Among the projects and programs which will shape our future transportation patterns and which meet these criteria are the following:

Central Artery / Third Harbor Tunnel and North-South Rail Link

The Central Artery / Third Harbor Tunnel Project is the largest public works project in the history of the United States. This massive project will dominate the transportation agenda of Massachusetts into the next century. The engineering, construction and financing challenges of this project are extensive and will continue to demand careful scrutiny and management by the Commonwealth.

When completed, the 6-lane elevated section of I-93 which traverses downtown Boston, will be replaced with a new 8 to 10-lane roadway which will be mostly underground. The Massachusetts Turnpike (I-90) will be extended to Logan Airport by a 4-lane tunnel under Boston Harbor. The new underground Central Artery will be the final link in the Nation's Interstate Highway System.

This project will give metropolitan Boston a modern, efficient and state-of-the-art highway system. The Central Artery / Third Harbor Tunnel project will provide vital intermodal connections between the busiest port, airport, and transit system in New England. Pedestrians and bicyclist will access the broad, tree-lined boulevards and the hundreds of acres of park-land that will be created by the demolition of the infamous "green monster." Economic forecasts project that the enhanced mobility resulting from this project will increase productivity through reductions in wasted time due to travel delays.

A North South Rail Link is being studied as part of the Northeast Corridor which would extend Amtrak service to Portland Maine. It would be constructed under the Central Artery and would help promote inter-suburban commuter rail.

Logan 2000

Massport is embarking on a major reconstruction of airport facilities to improve passenger access and mobility. Existing terminals and support facilities are over 25 years old and require major upgrading or replacement. Transit access will be improved by a new people mover system which will link the terminals to each other and to the Airport MBTA station. In addition, the Third Harbor Tunnel entrance and approach roadways are being constructed through the airport with the promise of improved access to and from the airport as well as improved ground transportation throughout the airport. The confluence of these factors has furnished the challenge and the opportunity to reinvent Logan International Airport as an intermodal transportation center for the 21st Century.

Intelligent Transportation Systems

Management of transportation systems in the future will incorporate the use of advanced computers, electronics, and communications to integrate activities for the entire surface transportation system. These intelligent transportation systems (ITS) will utilize a full range of technologies to develop a truly intermodal system that offers user services in the areas of travel planning, traveler information, travel management, travel payment, commercial vehicle operations, emergency management, and advanced vehicle control.

Strategies for near-term and long-range deployment of ITS elements in the Metropolitan Boston region were developed and presented as part of an early deployment study completed in January 1993. Similar planning activities are beginning which will lead toward the development of a statewide ITS strategic deployment plan. Further ITS strategic planning activities include active participation in the I-95 Corridor Coalition and ITS America, a nationwide organization devoted to the advancement of ITS activities.

Meanwhile the state transportation agencies continue to move toward the integration of these advanced technologies throughout the transportation system. Examples of this integration of technology with transportation management systems include planning and design of surveillance, detector, monitoring, control and emergency systems for the Central Artery/Third Harbor Tunnel; the continued testing of advanced traveler information systems (ATIS) to provide real-time information for pre-trip and enroute user services; multi-agency cooperation for the development of electronic toll collection and toll management systems; and deployment of dedicated fiber-optic communications networks throughout the state.

Bicycle and Pedestrian Projects

Projects and programs designed to promote bicycling and walking will focus on safe travel on existing streets as well as the development of off-street multi-use trails. Off street facilities include: Cape Cod and Islands Projects, Minuteman Commuter Bikeway and the Norwottuck Rail Trail. In 1994m the Massachusetts Highway Department issued a comprehensive manual entitled "Building Better Bicycling." The manual provides engineering guidance based on AASHTO and FHWA publications. It also provides program information on education, enforcement and encouragement issues.

High Speed Rail and Commuter Rail Extensions

Amtrak's plans for full electrification of the Northeast Corridor will reduce rail travel time to New York City to three hours. Amtrak is also making plans to extend rail service to Portland Maine, completing the Northeast Corridor. Fast and affordable train service will preclude the need for major new airport facilities in Massachusetts.

The Old Colony Commuter Rail Restoration project will provide South Shore commuters with an additional alternative to the Southeast Expressway. The Middleborough, Plymouth, and Greenbush Lines will restore service to 23 cities and towns. Congestion on the Expressway plus crowding on Red Line trains and in station parking lots has driven the development of this project from the planning to the construction stage. The Old Colony project is the largest mass transportation project in the region. In addition to the Old Colony Commuter Rail Restoration project, commuter rail will also be extended to Worcester and Newburyport. The feasibility of commuter rail service to Fall River and New Bedford is also under study.

Congestion Mitigation and Capacity Improvements

South Boston Piers Transitway

The South Boston Piers Transitway will connect the piers area of South Boston with the South Station Transportation Center. Trackless trolleys will provide improved intermodal connections between the piers and the core MBTA rail system via a dedicated tunnel under the Fort Point Channel. Construction of the tunnel will be coordinated with the Central Artery / Third Harbor Tunnel project.

Route 146 / Route 20 / MASSPIKE Interchange

The Route 146 / Route 20 / MASSPIKE interchange will enhance mobility in central Massachusetts. This project will dramatically improve access to the City of Worcester and surrounding communities. Route 146 is the principal North-South arterial of the Blackstone Valley.

Route 44

One of the biggest transportation challenges facing southeastern Massachusetts is the difficulty of east-west travel. Route 44 is the major east-west arterial in the region. A new interchange at Route 3 is currently under construction. Route 44 (between Route 3 and Route 495) will be replaced with a divided highway which will intersect Route 3 at a location slightly north of the current location. Next to the Central Artery / Third Harbor Tunnel, this is the largest highway project in the Commonwealth and assures greater access to southeastern Massachusetts.

High Occupancy Vehicle Lanes

High Occupancy Vehicle (HOV) lanes will be constructed on most of the radial highways in the metropolitan Boston area. Using movable barrier technology, a contraflow HOV lane will be added to the Southeast Expressway on an interim basis. Eventually the movable barriers will be replaced by a dedicated reversible flow HOV lane. The recent extension of the I-93 HOV lane north of the Central Artery will be extended to the New Hampshire border. HOV lanes are also planned for Route 24 and I-95 in the future.

Route 128 Project

Prudent investments in highway projects that increase capacity are warranted when other alternatives are unable to solve congestion and air quality problems. Alternatives are being studied for ways to add-a-lane to Route 128 in each direction. It is yet to be decided is whether the new lanes will be HOV or general purpose.

Other New Interchange Projects

A new interchange with I-495 on the Marlborough / Southborough border will relieve traffic congestion and prevent serious environmental impacts predicted to occur without it. Another interchange project with major regional implications will provide more direct access from I-93 to the Woburn industrial area. This project will reduce congestion on local roads as well as on the nearby I-93 / I-95 interchange.

Circumferential Transit

Three new crosstown bus routes will be established as part of the Urban Ring. These routes will meet the needs of both employers and employees by linking the radial transit lines and providing improved service to employment and shopping centers outside the downtown.

Route 8A and Route 2 Improvements

Two highway projects important to people in western Massachusetts are the reconstruction of Route 8A from Plainfield to Vermont and the relocation of Route 2 from Orange to Erving. These projects will greatly enhance mobility and make these areas more attractive for investment and economic growth.

Intermodal Centers

Intermodal centers are planned for Hyannis, Worcester, Springfield, Brockton and South Station in Boston. Fort Devens is being redeveloped as an intermodal freight facility. Double stacked container rail cars will move freight in and out of Fort Devens with significant competitive advantages for our region.

Park-and-Ride Facilities

To reduce the number of single occupant vehicles (SOV) and promote carpooling and transit options 20,000 new park -and-ride spaces are being developed across the Commonwealth. There are currently over 40,000 park-and ride spaces in Massachusetts. These additional spaces will provide motorists with options other than driving alone.

Implementation of the Americans with Disabilities Act of 1990

The MBTA is launching a major effort to help senior citizens and customers with disabilities access MBTA services. Among the improvements to existing facilities are: tactile strips on the edge of train platforms, curb cuts, sign upgrades, telephones with volume controls and elevator modifications. More lift-equipped buses will be delivered in early 1995 making more than two-thirds of the bus fleet wheelchair accessible. To make the Green Line more accessible the MBTA is acquiring 100 "low floor" cars. This feature, combined with upgraded stations will make the Green Line accessible to persons with disabilities. As part of the Blue Line modernization, the entire line will be made barrier-free.

Scenic Byways and Open Space

The preservation and enhancement of scenic byways is an important contributing factor to our quality of life and our travel and tourism industries. Scenic byway studies are currently under way for Route 6A on Cape Cod and Route 20 in Berkshire and Hampden Counties. The Commonwealth's Open Space Program focuses on the protection of scenic and natural qualities. To achieve this goal, parcels of land contiguous to the road system are acquired for scenic and environmental preservation.

Transportation Enhancements

States are required by ISTEA to set aside ten percent of certain funding categories for projects that enhance community, environmental, scenic, or historical value of the transportation system. Massachusetts is in the process of revising its Enhancement Guidelines in order to assure that the Enhancement Program selects projects of the highest quality and significance to the Commonwealth.

Water Transportation

It is expected that expanded water-shuttle service within Boston Harbor will carry 7,000 passengers a day by 1996. In addition, new commuter boat terminals are under study for Plymouth and Quincy, as well as at North Shore sites with access to I-95.

MOVING FORWARD

Accessing the Future has been prepared to focus public attention on the transportation, environmental and fiscal issues facing Massachusetts. The Intermodal Surface Transportation Efficiency Act emphasizes the need for public participation and consensus building when establishing priorities. This Plan is the outgrowth of a comprehensive, cooperative and continuing regional planning process. Our goal is to strengthen this process.

At the same time that we move to strengthen the regional planning process we must also consider the benefits of restructuring our transportation agencies into a cohesive, responsive and integrated Department of Transportation. Policy, planning, and funding decisions at the State level must originate from a single source and be implemented consistently by transportation agencies and departments in order to achieve our intermodal vision of the future.

Perhaps our greatest challenge is meeting the transportation demands of tomorrow with the limited resources of today. It is important to remember that every initiative in this Plan must compete for funds in a fiscally constrained environment. For this reason, public input and participation are crucial to meeting this challenge. If taxpayers are going to agree to pay for the transportation future outlined in this Plan, then they are going to demand that they be at the table when the decisions are made, and rightfully so.

By investing in our transportation future today, the glimpse of the future portrayed at the beginning of this chapter will become a reality. The projects and programs outlined will enhance mobility, protect our environment and our quality of life, and promote economic growth. **Accessing the Future** is much more than a transportation plan. It represents a new direction with new priorities for state government. If we work together, stay true to our principles, and focus on our mission, we can achieve our vision of the future through the implementation of the ambitious policies, goals, and objectives outlined in this plan. The transportation legacy we will leave our grandchildren tomorrow is on the drawing board today. While the task may seem daunting and the resources elusive, we need only remember the transportation system our grandparents grew up with and contemplate the great advancements they made. The torch is passed, the challenge taken up.

CHAPTER 4

REGIONAL PLAN SUMMARIES

The transportation planning process is a cooperative effort that involves elected officials, transportation professionals and the public. **ACCESSING THE FUTURE** is a policy document that will guide the development of the Regional Transportation Plans produced by the 13 Metropolitan Planning Organizations across the Commonwealth. The Regional Transportation Plans are project-specific documents that must be updated at least every three years. This chapter contains summaries of the most recent Regional Transportation Plans, which were formally adopted in November, 1993. Future revisions to the Regional Transportation Plans will be based upon the policies contained in **ACCESSING THE FUTURE**, after it has been amended to incorporate additional public comment.

Each plan summary uses a standard format consisting of six sections:

- Regional Profile
- Regional Goals
- Existing Conditions and Problem Identification
- Future Conditions and Problem Identification
- Environmental and Other Issues
- Recommendations: Projects and Programs

The Commonwealth of Massachusetts and the Regional Planning Agencies are working cooperatively to produce **ACCESSING THE FUTURE**. The regional profiles, goals, conditions, problems and issues outlined in this section are crucial to the selection of projects and programs that will transform the results of these plans into a statewide blueprint for transportation planning well into the next century.

BERKSHIRE COUNTY REGIONAL PLANNING COMMISSION

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BERKSHIRE COUNTY REGIONAL PLANNING COMMISSION (BCRPC) REGIONAL TRANSPORTATION PLAN SUMMARY

Federal regulations require an adopted regional transportation plan as a condition for funding of transportation improvements. The purpose of the plan is to ensure that various transportation projects are consistent with the area's overall development policies and are coordinated with one another to provide an effective transportation system which makes efficient use of available funds.

REGIONAL PROFILE

Berkshire County is comprised of two cities and thirty towns and has an area of 606,180 acres or 947 square miles. Elevations range from 3491 feet at Mount Greylock, the highest in the State, to 594 feet in Williamstown on the Hoosic River. Two main rivers drain the County, the Hoosic in the north, and the Housatonic in the south.

The 1990 United States Census recorded 139,352 persons, a decrease of 4.0 percent over 1980. Nearly 97 percent of the region's population is white; blacks comprise most of the balance (1.8%). Eighty-five percent of the Berkshire area is predominately rural. There has been a recent decline of manufacturing and an increase in the service sector.

Nearly half of the total population is concentrated in two urban municipalities, Pittsfield with a 1990 population of 48,622 and North Adams with 16,797. In 1990, the labor force totaled 69,963 with an unemployment rate of 6.7%. The region's largest enterprise is the Martin Marietta/GE industrial complex in Pittsfield, employing about 4300 workers in 1990. Per capita income in Berkshire County was \$14,857 in 1989.

REGIONAL GOALS

Over a period of time, transportation goals and objectives for the region have evolved from a number of efforts, notably by the Transportation Advisory Group (TAG), the Berkshire County Regional Planning Commission (BCRPC), and local growth policy statements. There is generally widespread support and agreement for these goals and objectives. The primary goal is to provide for the safe, economical, efficient, and convenient movement of people and goods over a balanced multi-modal transportation system compatible with the socio-economic and environmental characteristics of the region. Objectives for achieving this goal are to minimize traffic congestion; improve public safety; improve mobility within the region; improve access to areas outside the region; provide

transportation improvements to meet commercial and industrial needs; provide transportation improvements to accommodate recreational traffic and to preserve scenic routes while minimizing conflicts between the dual function of roads to provide both mobility and access to property; and maintain a continuing transportation planning process.

EXISTING CONDITIONS AND PROBLEM IDENTIFICATION

Although the total population has declined in the region, transportation demands have grown. This is due to the increases in total households, population dispersal, and employment, all of which have increased faster than total population.

Highways

The Berkshire County highway system consists of almost 2000 miles of roadways, 10% of which are arterials carrying more than half of all vehicular traffic. The most dominant highways are Routes 7 and 8 running north-south in the County. The Massachusetts Turnpike (I-90) carries interstate traffic east-west into and through the region.

It is estimated that the highway system served 532,000 vehicle trips per day in 1990 for a total of 3,200,000 vehicle miles of travel per day. The vehicle trips generally consist of 90% automobiles, 10% trucks, and less than 1% buses. The vehicle miles of travel consists of 85% autos, 15% trucks, and less than 1% buses. The highway system carried 700,000 passengers per day in 1990 at an average of 6.0 miles per passenger trip.

Problems with traffic flow are due to various factors related to congestion and accessibility. These problems occur primarily in the more densely developed communities such as Pittsfield, North Adams, Lee, Lenox, Adams, and Williamstown. While congestion results when demand exceeds the capacity of the road, other factors also contribute to delays such as a poor highway network, poorly designed highways, conflicting highway uses, and the nature of traffic itself.

Safety

Traffic safety is a major problem of the transportation system. Accident rates are primarily related to the volume of traffic and the type of road. Narrow streets, trees and poles at the edge of the road, curb parking, poor sight distance, blind corners, and blind driveways or side streets contribute to the chance of accidents occurring. Other factors, such as the presence of a number of left-turning vehicles, a concentration of pedestrian crossings, and heavy oncoming traffic will increase accident rates. Route 2 is particularly hazardous for trucks because of the long, steep grades and sharp curves. The 25 highest accident locations in Berkshire County have been identified. All but three of those locations are in Pittsfield.

As traffic volumes increase, with resulting conflicts between vehicles entering and existing highways, the demand for more traffic signals also increases. Between 1982 and 1992, traffic signals in the county increased by 25%. In 1992, there were 89 existing signals in the county, 57 of those

were in Pittsfield. With the addition of currently proposed signals, there will soon be 40% more traffic lights which will contribute to further delays to through traffic.

Bridges

Substandard bridges are a deficiency in the transportation system which is noticeable throughout the region. Years of neglect and lack of maintenance have left many bridges in poor condition, particularly those previously owned by railroads. It is not legally possible for a legally loaded truck to reach the interstate system from some areas because of the lack of adequate bridges. Twenty-three of the most substandard bridges in the county have been identified.

Parking

Adequate parking supply is a very important problem in urban areas and town centers. The lack of parking spaces contributes to the relocation of stores and offices out of the urban centers into fringe outlying areas where there is ample land for free parking. This trend of business relocation conflicts with current efforts to revitalize existing downtown centers and with regional growth policies and objectives.

Pedestrians

The pedestrian environment is also of concern in downtown centers, particularly as it relates to safety and ease of movement. Many pedestrian/vehicular conflicts are found in built-up areas where a large number of pedestrians must cross heavily traveled streets. In addition, many heavily traveled streets do not have sidewalks and pedestrians and joggers must use the street itself. These conflicts hinder auto and truck traffic as well as creating safety problems for pedestrians. Pedestrian/vehicular conflicts are also a problem in residential neighborhoods where those streets are used by vehicles to bypass more congested urban roadways. In addition, with Berkshire County's variable weather, pedestrians often find themselves exposed to the harsh elements - wind, rain, snow, etc. Here again, such circumstances are in conflict with current public policies to revitalize downtowns and make them more attractive to businesses and their patrons.

Bikeways

While extensive travel by bicycle is made difficult by many steep grades and often inclement weather, this activity is popular for recreation as well as general transportation, particularly by youngsters below driving age. However, safety problems result when bicycles must use narrow, heavily traveled arterial and collector roads without adequate shoulders or sidewalks.

Buses

The bus system in Berkshire County includes local transit service from Williamstown to Great

Barrington operated by the Berkshire Regional Transit Authority (BRTA), regularly scheduled intercity buses operated by several major bus companies, and school buses. Of the estimated 3% of all passenger trips served by buses during 1990, 14% were served by the BRTA's 14 buses, about 3% by approximately 20 intercity buses, and the remainder, 83%, were transported by almost 300 school buses.

With a basic fixed route system established in the BRTA area in terms of new buses on new routes, remaining transit problems here are related to funding. This is a serious problem which threatens to result in the dismantling of the already small Berkshire Regional Transit Authority system. Existing paratransit services are also threatened by cutbacks of federal transit subsidies.

Rail

The maintenance of rail service in Berkshire County is of importance primarily for freight. While the main east-west line has been rehabilitated, the secondary feeder lines are not in as good condition. Most of the northern branch line has recently been abandoned altogether.

Intercity rail passenger service is currently being provided daily by AMTRAK on its "Lakeshore Limited" route from Boston to Chicago through Pittsfield. While the service could be useful for trips to Boston for shopping or business, the schedule is such that one cannot reasonably expect to travel to Boston and return the same day. The trains are also, at times, behind schedule by an hour or more.

There is also interest in re-establishing rail passenger service to New York City. In 1987, an extensive consultant study concluded that such service would not be viable because of insufficient ridership and the extensive public subsidies that would be required.

Air

The three airports in the County provide general aviation service, normally there is no scheduled passenger service. A major problem with these facilities has been the noise impacts which they can create on nearby land uses. This occurs because of airport usage growing slowly over time with resultant runway expansion and consequent use of jet aircraft. At the same time, residential development of once open land brings additional people within the sound range of the flight path. In addition, ground access to the Pittsfield Airport is poor, being very indirect and roundabout over narrow roads, in spite of the "airport connector" road, recently constructed by the state, which ends about a mile from the terminal.

Infrastructure Maintenance

It is very difficult to keep up with the maintenance and replacement of Berkshire County's bridges and roads. This problem is the result of insufficient funding for highway improvements. Continued deterioration of these important resources through deferred maintenance will lead ultimately to economic decay because of the increasing hidden costs of an inefficient transportation system.

Pittsfield Area

This long-range issue focuses on the transportation problems in the central Berkshire area where the bulk of the County's population resides. This issue has been unresolved for many years, hindering many other planning decisions which it affects. Numerous studies of the issue have been completed and a final decision is long overdue.

Traffic

Current downtown traffic flow problems are related to access, circulation, various delays and conflicts. Congestion hindering access and circulation is due to lack of capacity resulting from roads and intersections which are not built to accommodate all the traffic during peak hours.

Parking

Adequate parking is one of the most important considerations in the relative attractiveness of the downtown compared to suburban locations. In the CBD, limited patron parking is often used by employees who get there first, and removing curb parking to facilitate traffic flow is in conflict with the need for additional parking spaces.

Pedestrians

The pedestrian environment is also very important to the attractiveness of downtown. Conflicts with many autos and trucks makes it difficult to cross the various streets, walking distances can be long, especially from parking lots, grades must be climbed, and the changing New England weather must be endured.

Route 8 Corridor

The Route 8 Corridor connects the primary population centers in the region. The existing two-lane road offers few safe opportunities to pass slower vehicles such as trucks. More and more roadside development results in additional conflicts at driveway entrances. Conflicts with on-street parking, pedestrians, and residences can be noted along built up areas. Narrow shoulders, poles, trees, and buildings close to the edge of the road are also safety problems.

Route 7 and 20 (Mass. Turnpike Access)

Route 7/20 provides the main access between Pittsfield and communities to the south. With Pittsfield being located some 10 miles from the Mass. Turnpike, improved access from the interstate system is seen as an important transportation issue for not only the central city, but also for North Berkshire.

The main road between Pittsfield and the interchange in Lee is substandard compared to the type of arterial highway normally found between cities of 50,000 population and the interstate system. Most of the road consists of an obsolete two-lane roadway with considerable roadside development, long steep grades, and poor sight distance.

The most notable difficulties in reaching the Mass. Turnpike from the north are found in the Town of Lee. Here traffic must endure delays due to long hills, narrow roads, several right-angle turns, on-street parking, and pedestrians in the center of town. The presence of Mass. Turnpike traffic also causes problems of congestion and safety for local residents, particularly on busy summer season weekends.

North Berkshire

In addition to problems of access to Pittsfield and the Mass. Turnpike as previously noted, the larger North County communities also have local circulation, access and safety problems.

South Berkshire

Traffic on Main Street in Gt. Barrington and Stockbridge creates conflicts with pedestrians and on-street parking. The most severe problems, however, occur during the summer tourist season.

Coltsville

This suburban shopping area is located in Pittsfield at a congested intersection, which is frequently cited as a major transportation concern in the region. A short-range Transportation System Management type of solution is currently being undertaken by the State to provide some immediate relief.

FUTURE CONDITIONS AND PROBLEM IDENTIFICATION

The BCRPC uses a state-of-the-art economic/demographic simulation model to produce standardized population projections for Berkshire County which are used for all functional planning including transportation. These forecast a recovery from the recent population decline. Berkshire's 1990 population of 139,352 is projected to grow to 147,700 by the year 2020.

Although population decline in the region is expected to slowly rebound, transportation demands are expected to be somewhat higher. This is due to the increases expected in households, population dispersal, and employment, all of which increase faster than total population. In the year 2020, projected households will be almost 16% higher than 1990, and the number of vehicle trips is expected to increase by almost 13%. Due to these expected increases in traffic, problems such as congestion, conflicts between pedestrians and vehicles, accidents, truck traffic, and vehicles using residential streets as short-cuts are expected to worsen.

ENVIRONMENTAL AND OTHER ISSUES

One purpose of the transportation planning process is to ensure the integration of transportation planning with environmental concerns including energy conservation, land use and air quality. The following sections address these issues.

Energy

The fundamental problem relating to energy is that petroleum is the energy source for transportation purposes and petroleum is a finite resource for which there is an ever-growing demand. An area like Berkshire County is heavily dependent on automobile travel because of the dispersed low-density population which has a tendency to live away from jobs, stores, and necessary services. Under these circumstances, public transit cannot be expected to operate efficiently (on a financial or energy basis) over a wide area, and reliance must be placed on the automobile.

Under these circumstances, the improved fuel economy of newer vehicles will aid the conservation of energy. Public policies to concentrate development can also result in less energy consumption to the extent that the average trip length can be reduced.

The solution to the region's problem with energy for transportation is to implement measures which will reduce demand. The responsibility for accomplishing this, however, does not rest solely with the region. Federal and state governments are the only ones that can implement certain types of measures, while some measures must be implemented at the local or regional level, and other measures depend on the involvement of private individuals and industry.

Air Quality

Transportation is a large component of the air quality problem. Vehicle emission rates are a function of the total amount of traffic, the speed of traffic, the amount of stop-and-go traffic, the types and ages of vehicles in the street, and the air temperature. The major pollutants of concern with regard to transportation are carbon monoxide (CO), and hydrocarbons (HC) which break down to form Ozone. Since Berkshire County has been designated as a "non-attainment" area, hydrocarbon emissions are of primary concern.

The goal then is to reduce transportation-related air pollutants through transportation control measures (TCM'S) which will improve traffic flow and vehicle operating efficiencies.

RECOMMENDATIONS: PROGRAMS AND PROJECTS

The programs and projects that follow represent the region's transportation agenda for the future.

Corridor Preservation

Since right-of-way acquisition for large construction projects creates considerable difficulties for

landowners and relocatees, it would be desirable to set up a program for advanced acquisition of ROW's for major long-range construction projects. Property could be acquired as it is put up for sale. In addition, the state should have the option either to authorize local building permits within the corridor or to buy the property. These methods could also be extended to include existing arterial highways. This would involve the land adjacent to the highway and could avoid the occurrence of strip-developments.

Preservation of the scenic aspects of the Berkshire Region is important for the residents' quality of life and the economic attractiveness of the area for both tourism and new businesses. This can be done by a combination of techniques including land use controls to minimize strip development, removing illegal billboards, designation of scenic roads to preserve stonewalls and trees, direct acquisition of adjacent land, as well as sensitive highway engineering and appropriate landscaping.

Pittsfield Area

More than a decade ago, after careful examination of available data and information, the alternatives to this problem area were narrowed down from 14 to 2 by the Transportation Advisory Group (TAG). The majority view favored a Western Bypass, while the minority favored Street Improvements. Currently the state's new task force is reviewing the need and alternatives in order to ascertain sentiment on the subject.

Downtown Pittsfield

Revitalization efforts in Pittsfield's central business district give downtown transportation concerns a special significance.

Traffic

It is recommended that any downtown circulation scheme include the following elements, as appropriate: Improve signalization, adjust cycles and provide modern self-actuated signals to maximize capacity and minimize delays; Designate one-way streets to improve capacity and passing opportunities and increase safety and to minimize conflicts from turning vehicles; Eliminate left turns at certain intersections as necessary; Remove curb parking where absolutely necessary; where feasible, limit the ban to peak hours only and use the lane for buses if possible; Provide off-street loading areas to remove parked trucks from main roads and also consider restricting truck deliveries to off-peak hours to minimize conflicts with traffic; Identify specific truck routes to ensure smoother truck traffic flow and minimize conflicts with pedestrians and residents; Direct traffic to adjacent streets where possible; Redesign critical intersections to improve capacity, safety and traffic flow; Widen existing roads only where absolutely necessary; Provide new roads to complete important connections in the highway network and enforce regulations against double parking and jaywalking.

Parking

An overall downtown parking plan should consider the following: Decks over existing lots to increase their capacity; Acquisition of additional property to provide new off-street parking in specific areas; Where feasible, removal of curb parking should be limited to the peak hours so that these spaces would be available for the use of patrons during the off peak; The prime parking areas should be reserved for free patron parking and carpooling in order to encourage patrons to shop downtown and to encourage employee use of transit or carpooling; and regulations against double parking, overtime parking, etc., must be aggressively enforced.

Pedestrians

A number of points must be considered as part of any efforts to devise an appropriate pedestrian circulation scheme. While pedestrian/vehicular conflicts would best be reduced by removing some of the traffic from existing streets as in the case of a bypass, they can also be minimized by providing for pedestrian overpasses and/or auto free zones for pedestrians only. Current pedestrian crossing regulations can also be rigorously enforced. Awnings or overhangs minimize the problem of weather on existing streets. Walking distances and grades could be accommodated with a free downtown circulator shuttle bus or jitney as appropriate. Pedestrian amenities such as benches and seating areas along with bus stop shelters are also desirable.

Route 8 Corridor

Alternative Route 8 alignments have been identified by the State. Consideration should be given to the feasibility of using the recently abandoned railroad Right-Of-Way for a possible relocation of Route 8. A corridor study is needed to determine the most appropriate solution for this problem area.

Route 7 and 20 (Mass. Turnpike Access)

Alternative solutions for Lee's congestion problem have been identified. These alternatives include improving existing streets or diverting traffic with new roads and/or new interchange locations. The most expeditious of these alternatives appears to be the relocation of the Mass. Pike toll barrier in West Stockbridge to a new location east of Route 7. This alternative is the least expensive, presents few engineering problems and has relatively little environmental impact.

North Berkshire

Transportation improvements that would contribute to the revitalization of the City of North Adams include upgrading of intersections, rehabilitation of substandard bridges, and provision of off-street parking. Previous reports have identified alternative solutions for Route 2 and one of the most notable recommendations is the minimization of driveway entrances. Corridor preservation would help to alleviate this problem and would ultimately be less expensive than building a new road when the existing road becomes thoroughly clogged.

South Berkshire

One alternative to the problems in Stockbridge would be a new two-lane road essentially bypassing the village center. This option could reduce the traffic on Main Street by about half since traffic from the Great Barrington area to Pittsfield or the Mass. Pike would be routed around the center of Stockbridge.

Coltsville

Major solutions to the Coltsville problems would likely involve some sort of grade-separated interchange or a new roadway to bypass the intersection. Consideration should be given to the potential of using the secondary branch railroad right-of-way from Merrill Road north to the Lanesboro line.

Multimodal Transportation Terminal

The City of Pittsfield is the focal point of activity in the region and the downtown is the focal point of activity in the City. A multimodal transportation terminal would be a valuable addition to the various activities in the revitalization of the central business district.

Air Quality

In Berkshire County, the air quality impacts associated with transportation are most effectively alleviated with the federal motor vehicle emissions standards and the state inspection and maintenance (I&M) program. Therefore, these regulations should be continued and adequately enforced.

Airport Noise Abatement

The inherent problem of airport noise, although it cannot be totally eliminated, can be minimized through three basic actions, preferably in combination rather than as single-action solutions. They are noise reduction at the source, noise abatement operating procedures, and land use controls.

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BOSTON METROPOLITAN PLANNING ORGANIZATION (MPO) REGIONAL TRANSPORTATION PLAN SUMMARY

The Boston MPO prepared its 1993 long-range Plan in order to carry out a new mission for transportation in the Boston region, consistent with the requirements of ISTEA. The principal role of the Transportation Plan is to identify goals, policies and investments to support a balanced multimodal system.

The Plan specifies the goals and policies for the regional transportation system. It presents a comprehensive set of goals and policies for the various transportation modes, and identifies how the transportation system should help to support economic development, reduce air-pollution, and provide physical accessibility. The plan assesses how each mode functions individually and then how it fits into the overall transportation system. It contains a summary of system-wide operating statistics, as well as background information on the components of the regional transportation system: highways, transit, rail, ports, air travel, freight movement, and bicycle and pedestrian travel.

The Plan also estimates future transportation needs and fiscal resources. It describes future conditions and identifies opportunities that will be available for decision makers, and contains a financial element that examines the resources expected to be available to fund improvements.

Finally, the Plan presents recommendations to improve the transportation system and to address the multiple requirements enumerated by federal and state laws and regulations. Environmental responsibility, a hallmark of these regulations, is expressly addressed. The recommendations presented in the Plan emphasize reservation of the existing system. They also consider environmental, economic-development, and intermodal needs within a financially feasible program. This acknowledges that transportation systems are not designed for a single function but for many parallel ones: commuting, freight movement, economic development, emergency services, recreation, and tourism, among others.

REGIONAL PROFILE

The Boston Metropolitan Planning Area is comprised of 101 cities and towns bounded by the Atlantic shore and roughly encompassed by Interstate 495. Along the coastline, the regional limits extend as far north as Ipswich and as far south as Duxbury.



The MPO members:
Executive Office of Transportation & Construction,
Commonwealth of Massachusetts
Massachusetts Highway Department
Massachusetts Bay Transportation Authority
Massachusetts Bay Transportation
Authority Advisory Board
Massachusetts Port Authority
Metropolitan Area Planning Council

The region is the largest in the Commonwealth of Massachusetts, with almost half of the state's population. The Boston Metropolitan Area also accounts for more than two thirds of state's employment base.

The city of Boston is the economic center of the metropolitan planning area. It draws workers from around and beyond the region. Each weekday, 607,000 work trips are made to Boston and Cambridge, representing 35.3 percent of all work trips made within the region.

The diverse nature of the region is related to its population and land use characteristics. An influx of Asian, Hispanic and black immigrants into the region has contributed to a population increase in the oldest cities. Meanwhile, the suburbs have experienced little or no population growth, except in the towns along the Interstate 495 belt where both the availability of land, less expensive housing, and a strong potential for job growth exist.

The diversity of its population, commercial services, and industry is clear proof of the region's ability to successfully compete in the global marketplace.

REGIONAL GOALS AND POLICIES

The 1993 Transportation articulates a transportation vision for the metropolitan area, and then establishes goals and policies for accomplishing this vision:

It is the vision of this Transportation Plan to maintain, manage, and operate a multimodal transportation system in the Boston region that provides a high level of mobility for all people and economic activity consistent with environmental and fiscal resources.

In the twenty-five years covered by this Plan, the Boston Metropolitan Planning Organization (MPO) will seek to carry out this vision of a balanced and affordable transportation system that sustains the economic vitality of the region. The Plan advocates six goals which have been based on the vision statement and on information provided in federal and state legislation, as well as plans and recommendations developed by state and regional agencies. These are:

- Establish the framework and guidelines for decision-makers to use when selecting among projects, programs, and facilities that meet different and sometimes conflicting objectives. This framework should include measures to ensure that limited financial resources are used in the most effective manner.
- Ensure the mobility of people and goods by implementing repair/maintenance programs, transit capacity improvements, intelligent vehicle systems, and congestion management programs which increase highway capacity for single-occupant vehicles only when no better alternative can be found.
- Use investments in transportation infrastructure to improve the economic and environmental sustainability of the region by supporting existing and planned mixed-use development concentrations.

- Improve the economic competitiveness of the region by encouraging the location of new development in urban cores, thereby best utilizing existing infrastructure while protecting natural resources and providing increased economic opportunities to all the region's citizens.
- Minimize the costs in time and money of transporting people and goods in the region.
- Ensure that the transportation program adequately meets appropriate legal mandates governing transportation investment and environmental protection.

In order to achieve the above vision and goals, this Plan endorses 15 policies described below. These policies reflect federal requirements, the Commonwealth's economic growth strategy, and the regional land use plan.

- Preserve and upgrade the existing system
- Effectively and efficiently integrate the various components of the transportation system
- Reduce congestion on existing services and facilities
- Reduce air pollution
- Make existing services physically accessible to people with disabilities
- Promote public involvement in all phases of transportation planning and development. This includes developing and using procedures that allow for continuous, timely, and meaningful public participation
- Stimulate and sustain regional economic development through timely transportation investments
- Promote the development of local land use policies that result in more efficient use of the regional transportation system
- Use transportation enhancement activities to preserve and improve the natural and built environments, making communities and the region more healthy and attractive
- Identify and preserve corridors for future transportation activities
- Ensure the safety and security of transportation system users
- Minimize water, soil, and noise pollution
- Secure, and apply efficiently, financial resources for the maintenance and modernization of existing facilities and for system expansion

- Coordinate the development of the Transportation Plan with ISTEA-mandated management systems
- Continue to analyze transportation needs on a corridor and/or sub-area basis, using a multimodal approach

EXISTING CONDITIONS AND PROBLEM IDENTIFICATION

Even taking into account the existing deficiencies within the region's system, the Boston metropolitan area is well served by its transportation network. The transit system complements the highway network, Boston harbor provides safe transit for most forms of water transport and Logan airport serves as an important passenger and freight link to the region and the world. Intercity rail provides frequent service to points south and west. The close proximity of locations within the Boston core allows for ease of movement by pedestrians and bicycles.

While the discussion of these modes is done independently in the Plan, there is the recognition of the need to develop an interdependent system of travel that contains efficient intermodal connections. Boston is a major transportation connection point both within the New England area and to other areas of the world. Intermodal facilities such as Logan Airport, Boston Harbor, the Massachusetts Turnpike, the MBTA, Fort Devens, the local highway network, and intercity passenger and freight lines all provide a high level of transportation connections within the Boston area.

Overall use of the roadway system in the Boston region is summarized by Average Weekday Traffic (AWDT), Vehicle Miles of Travel (VMT), Vehicle Hours of Travel (VHT), and average operating speed of passenger vehicles (MPH):

AWDT	7,260,000	vehicle trips
VMT	61,063,000	miles per day
VHT	1,963,000	hours per day
MPH	31.1	miles per hour

About two-thirds of VMT occur at a volume-to-capacity (V/C) ratio of less than 0.75, and about 15% of VMT occur at a V/C ratio greater than 1.25.

There are an estimated 8,950,000 daily person trips in the Boston region for all trip purposes. About 7% of these are transit trips; the rest are auto trips. Of these daily person trips, about 2,540,000 are work related. Transit serves about 13% of these work trips; the balance of work trips are auto, walk, or bike trips. Compared to national estimates, a relatively large proportion of Boston regional travel is made by transit. Use of public transit, nationally, was 2.5% of all person trips in 1990, compared with about 7.3% for the Boston region.

Non-home based travel is a rapidly growing trip purpose. About half of this type of travel is work related, such as leaving the office during the day to attend a meeting and then returning to the office.

The rest is attributable to trip "chaining", such as leaving work at the end of the day and making a side trip to do an errand before returning home. Recurring congestion related to work travel contributes to delay, lost productivity, frustration, and air pollution. However, non-work travel comprises about 72% of daily trips.

Highlights of the Transportation Plan mode-by-mode analysis are presented below.

Highways

In order to address the problems of congestion on the roadways, the MHD has a number of on-going projects to encourage the use of alternative travel options and to increase the number of passengers per vehicle. Efforts include transportation demand management (TDM) strategies, HOV lanes, park and ride lots, support to programs such as CARAVAN, incident management, the "*SP" program and SmarTraveler. The ISTE management systems will help program projects necessary to maintain adequate pavement, safety, and bridge conditions.

Transit

The public transportation system in Greater Boston is composed of four primary modes: rapid transit (including light rail), railroad, bus, and boat. Each of the four modes developed independently.

The MBTA rapid transit and light rail systems are composed of 125 stations on four lines: the Red Line, the Orange Line, the Blue Line and the Green Line. All lines provide service to downtown Boston and all lines directly connect with each other, except for the Red and Blue lines. Daily ridership on the rapid transit/light rail system is approximately 562,000 trips per weekday.

The MBTA operates 159 bus routes throughout the MBTA district, including four trackless-trolley lines in Cambridge, Watertown and Belmont. In FY 1991, total bus ridership was approximately 360,000 trips per weekday. Nearly all routes connect with the rapid transit system at least at one location. In areas closer to Boston, buses provide crosstown service, feeder service to rapid transit stations, and line haul service in heavily congested areas. The MBTA operates express bus routes service from 11 communities. In 1991, typical weekday boardings on all express routes totaled 25,300 trips.

The 265-mile commuter rail network is composed of 11 radial lines with 101 stations, 39 of which are wheelchair accessible. In FY 1991, daily ridership was approximately 74,600 trips per day. Existing deficiencies within the transit system include:

- accessibility
- ensuring adequate funding to maintain the infrastructure of the existing system,
- alleviating congested sections of the system, and
- improving intermodal connections.

Rail: Intercity Passenger and Freight

The Boston region is served by an extensive network of freight and intercity passenger railroad operations. Freight rail service is provided by a number of carriers, and intercity passenger service is provided by Amtrak.

The two predominant freight rail carriers in Eastern Massachusetts are the Consolidated Railroad Corporation (Conrail) and the Boston and Maine Corporation (B&M). An existing constraint to efficient freight movement is the lack of proper bridge clearance for the shipment of double-stack railcars. The state is working with the rail carriers to address this problem.

Pedestrian and Bicycle Facilities

The Boston metropolitan area is currently served by a number of bicycle/pedestrian paths maintained by the Metropolitan District Commission (MDC), the City of Boston, the MBTA, and local communities. The longest facility is the Minuteman Commuter Bikeway. The Charles River (Paul Dudley White) Bike Paths, which form a 14-mile loop from Watertown to Cambridge and Boston, are located on both sides of the Charles River.

According to the U. S. Census estimates, communities with a bicycling mode-split over one percent are Cambridge (3.05%), Somerville (2.01%), and Brookline (1.83%). Communities with Census-estimated walk shares over ten percent are Cambridge (25.02%), Wenham (17.29%), Boston (14.28%), Wellesley (12.01%), Brookline (11.88%), and Somerville (10.93%).

Air: Passenger, Freight, Ground Access

Logan International airport provides extensive air connections for both passenger and freight movement in the Boston region. It serves both domestic and international flights, cargo shipments and general aviation aircraft. Logan is the 10th busiest passenger airport in the world handling about 23 million passengers in 1990. The airport handled about 680 million pounds of cargo in 1990.

The airport is located on 2,400 acres of land across Boston Harbor from downtown Boston. The urban location of the airport and its proximity to downtown Boston makes it convenient by both rapid transit and water transit. At present it is served by a stop on the Blue Line and a water shuttle from Rowes Wharf with shuttle bus links to the terminals. For suburban areas, Massport operates express bus service from Framingham, Braintree, and Woburn. The planned MBTA Airport station renovations will provide improved transit access to Logan Airport.

Water: Ports, Harbors, and Inland Waterways

The Boston metropolitan area is fortunate to have a number of port facilities that support shipping, as well as fishing, water transportation and maritime recreational needs. Deep water ports with good rail and highway access are a scarce resource. To protect this resource, Massachusetts Coastal Zone Management (CZM) established nine areas within the Boston MPO region as Designated Port Areas

(DPA).

The marine terminals of Boston Harbor provide facilities for passenger ferries and ships, fishing vessels, bulk freight, break-bulk freight, and containerized cargo vessels. New small vessel docking facilities in the harbor, such as at Rowes Wharf and Long Wharf, have increased docking space for commuters and recreational users of the waterways.

Commuter passenger boat service operates between Hingham and Rowes Wharf (Boston), between Rowes Wharf and Logan Airport, between the Charlestown Navy Yard and Long Wharf (Boston), and from Point Pemberton in Hull to Rowes Wharf.

Recent infrastructure improvements by Massport to its terminals have increased the capacity for handling ocean-going cargo and passenger vessels. Massport operates a number of the port facilities in the harbor. In addition to Massport facilities, the harbor contains numerous private terminals and cargo facilities that handle most of the bulk cargo, including oil products, liquified natural gas, salt and cement. In 1992, over 16,350,000 tons of cargo was shipped through the Port of Boston in over 2,000 cargo vessels. The major bulk commodity in the Port is petroleum. The petroleum tank farms along the Chelsea Creek supply over three-quarters of the home heating oil and over two-thirds of the gasoline for the region.

The major deficiencies that currently restrict port operations are:

- the need for dredging in parts of Boston harbor
- the need for increased cargo off-loading capacity
- the need for improved intermodal connections (rail and highway)
- the need for alterations to the Chelsea Street bridge

FUTURE CONDITIONS AND PROBLEM IDENTIFICATION

The changing shape of the Boston urban area has implications for the transportation system. Once, the standard metropolitan development pattern consisted of a central business district ringed by residential suburbs. Suburb-to-central city work trips were efficiently served by "hub and spoke" transit lines that converged downtown. But suburban development now includes commercial and industrial uses.

The forecast for the 2020 Base Case estimates that auto person and transit passenger trips will increase by about 11%, but highway vehicle trips will increase by more than 17%. This is attributed to continued decreases in auto occupancy. Vehicle miles of travel (VMT) in the 2020 Base Case are forecast to increase by approximately 25%, far greater than the increase in highway vehicle trips. Much of this increase in VMT is due to longer distance trips. Over the forecast period, this is an annual growth rate of about 0.9%. Vehicle hours of travel (VHT) are forecast to grow by 35% in the Base Case, evidence of growing system-wide congestion.

Despite the increases in VMT and delay estimated by the 2020 Base Case, emissions are forecast to diminish. This reflects the benefits of:

- Centralized, enhanced vehicle inspection and maintenance
- Use of reformulated fuel
- Increase of cleaner vehicles in the vehicle mix

The following sections describe the roles that each of the various modes of transportation will play in the future of the region.

The Role of the Central Artery/Third Harbor Tunnel

The Central Artery/Third Harbor Tunnel project is designed to improve access to and through downtown Boston. It will completely replace the elevated section of the I-93 Central Artery with a new depressed roadway with new connections from the Central Artery to I-93 North and Route 1 North. The Massachusetts Turnpike will be extended to Logan Airport by way of a new Seaport Access Road extending from the present terminus to the Third Harbor Tunnel.

The Future Role of Highways

The regional highway system will continue to carry the vast majority of person-trip travel and will be an important part of the freight movement system. Roads also will be the routes for buses, carpools, and vanpools, making the highway network an integral part of the public transportation system. If the highway system is to continue to provide reasonable service throughout the plan period, it is essential to keep it well-maintained. It is also important to plan for capacity increases only where future traffic will exceed capacity and where highway expansion is determined to be the best solution.

The Future Role of Transit

The advanced age of many components of the transit system means that preservation and reinvestment will be needed to keep it running efficiently. Future challenges largely consist of maintaining and upgrading the existing system. In addition, some selected expansions and improvements will be desirable to make the individual components of the system work together better.

The Future Role of Rail Freight

Boston was founded as a port city and much of its growth has revolved upon international trade. Marine port facilities are just the gateway, however, to a national (and international) goods movement network made up of highways and railroads. While cartage by truck will remain an important component of a competitive and multimodal freight network, an efficient, high capacity freight rail system is also essential to ensure the seamless movement of goods between the Port of Boston and to markets and manufacturers in the Northeast and the Midwest.

The Future Role of Pedestrian and Bicycle Travel

The Boston region MPO recognizes that increased bicycling and walking can reduce traffic congestion, air and noise pollution and fuel consumption. Thus, these two modes effectively contribute to the quality of life in the region.

The Future Role of Air Travel

The growth in air travel, both passenger and freight, experienced over the past decades is expected to continue into the future. A study commissioned by Massport forecast passenger volume of 37.5 million for the year 2010, a 63% increase over the 1990 volume of 23 million.

The Future Role of Ports and Water Travel

Progress in international trade talks, the consolidation of the European market and a shift in the locus of manufacturing from the Pacific Rim and Southeast Asia all point to an increased role for the port of Boston in the coming years. Boston is the closest major American port to Northern Europe - a full day closer than New York in sailing time. With improvements to the land side freight system, Boston can offer a real time advantage in moving goods to and from inland markets.

The preceding discussion of the components of the regional transportation system helps to frame the choices that must be made in this plan. The system is mature and will require regular investments to preserve its capabilities, but there will be opportunities to improve efficiency through the use of technology and increased emphasis on intermodal operations. Other additions—such as bikeways and HOV lanes—will assume greater importance in the future system.

The MPO analyzed a series of transportation and land use scenarios in an effort to identify projects that would best correspond to the travel needs and environmental considerations described in this chapter and the preceding one. In order to help identify the most balanced and effective set of projects for this plan, the MPO performed seven different transportation and land use model runs for the year 2020. The analysis:

- Examined the relationship between land use and transportation;
- Evaluated system-wide air quality impacts; and
- Estimated system-wide delay.

ENVIRONMENTAL AND OTHER ISSUES

ISTEA reinforces the need to incorporate environmental values in the transportation planning process. Moreover, ISTEA complements other federal environmental legislation such as the Clean Air Act, the Clean Water Act, and the National Energy Policy Act. Protection of the environment should be considered a priority from the inception of a transportation project or program to its completion and operation. The Boston-region MPO is committed to full support of federal and state environmental laws. The Boston MPO's support for proper environmental practices fits into the

overall EOTC commitment to full compliance with environmental regulations, within its statewide mission of providing cost-effective transportation systems. The Transportation Plan's four key environmental goals and policies are:

- Reduce air pollution to achieve and maintain the national ambient air quality standards (NAAQS)
- Encourage the use of low-pollution fuels and engine technology
- Use transportation-enhancement activities to preserve and improve the natural and built environments, making communities and the region more healthy and attractive
- Minimize water, soil, and noise pollution

The Boston MPO agencies are committed to using all practicable means to limit the adverse environmental impacts from existing and new transportation projects or programs proposed in this Transportation Plan. This is done through compliance with the Massachusetts Environmental Policy Act (MEPA) and the National Environmental Policy Act (NEPA) regulations. The environmental chapter discusses issues and programs related to bicycle and pedestrian programs, air quality, water quality, land use, open space, transportation enhancements, and energy conservation.

RECOMMENDATIONS: PROGRAMS AND PROJECTS

The recommendations in this Transportation Plan have been chosen on the basis of four priorities: 1) preservation of the existing system, 2) compliance with clean air goals, 3) continued enhancement of system accessibility, and 4) expansion of the system consistent with the Plan's policies and goals. The recommended projects and studies are divided into six categories that reflect both time periods for planning purposes and the degree of support, analyses and benefits associated with each project.

- Ongoing: This category spans all of the other time periods. It covers routine maintenance and infrastructure replacement and safety projects that occur on an ongoing basis.
- Current: This category covers non-maintenance projects that are in construction, and therefore are funded or at least partially funded (such as the Central Artery/Third Harbor Tunnel).
- Level 1, Awaiting Implementation: This category covers projects that have MEPA approval and are ready to be included in the TIP but are awaiting funding.
- Level 2, Short-term Projects (FY 1996-FY2000): This category includes projects that are undergoing detailed environmental, feasibility, and alternative analyses. Level 2 covers most SIP and ADA transportation commitments as identified by the MBTA, MHD, Massport, MTA, and EOTC. It also includes the study of projects for which short-term implementation appears feasible and/or desirable.

- Level 3, Long-term Projects (FY 2001-FY2020): This category covers transportation solutions which appear desirable given current analyses but which need further review and analyses in the regional planning and modeling processes to determine if the benefits justify further expenditures in Level 2.
- Level 4, Future Projects: These projects are the result of transportation plan analysis or other systems level needs analyses and are nominated by local governments, MPO agencies and other transportation agencies that serve the public. The MPO will review projects in this list to determine if they are consistent with the goals and policies of the Transportation Plan before they are advanced towards feasibility analysis and eventual implementation.



CAPE COD COMMISSION

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CAPE COD COMMISSION (CCC) REGIONAL TRANSPORTATION PLAN SUMMARY

The Long Range Transportation Plan for Cape Cod was developed in coordination with local and state efforts. The planning process began with an assessment of existing infrastructure, usage and system performance measures. This process led to an identification of present and future transportation needs. An extensive public participation process was developed and implemented to gather input during the development of the plan. Factors considered during the process include land use, historic preservation, environmental issues, economic issues and financial constraints.

Transportation is one of the most difficult issues facing Cape Cod. Residents and visitors are heavily dependent on private automobiles as the only reliable means of mobility; public transportation options are limited. As a result, traffic congestion is an increasing problem: the road system which is generally adequate to serve the Cape's year-round population becomes seriously overloaded with the influx of summer residents and visitors. Traffic congestion causes driver frustration, worsens air quality, increases accidents and wastes valuable time and fuel. Traffic congestion is probably the most visible negative consequence of an imbalance between land use and infrastructure.

REGIONAL PROFILE

Geographically, Cape Cod is a narrow peninsula that extends like a bent arm with a clenched fist into the Atlantic Ocean. The 364 square mile area is approximately 65 miles long - with a width ranging from about 3 miles in Truro to about 10 miles in Falmouth. Most of the Cape is separated from the mainland by the Cape Cod Canal which bisects the Town of Bourne.

Cape Cod consists of 15 diverse communities that have a total year round population of 180,000 people. The 1990 U.S. Census resulted in the designation of the Barnstable-Yarmouth Metropolitan Statistical Area (MSA), with a population of nearly 135,000. These statistics, however, do not provide a true picture. On a given summer day, the number of people on Cape Cod exceeds 500,000. While every town experiences an increase in summer population, the smaller communities, such as those in the Outer Cape, experience the largest percentage increases in population.

The economy is composed of several main elements. The largest components of the Cape's economy are based on tourism, seasonal businesses and retirees. A recent analysis of the Cape's economic base identified the following key segments:

- Tourists and seasonal businesses44%
- Retirees15%
- Manufacturing. 6%
- Marine 5%

- Business services 11%
- Defense 5%
- Commuters 7%
- Other. 7%

REGIONAL GOALS

Among the regional goals for Cape Cod are the following:

- To encourage sustainable growth and development consistent with the carrying capacity of Cape Cod's natural environment in order to maintain the Cape's economic health and quality of life, to encourage the preservation and creation of village centers and downtown areas that provide a pleasant environment for living, working and shopping for residents and visitors.
- To foster a transportation system on Cape Cod for present and future year-round needs which is safe, convenient, accessible, economical and consistent with the Cape's historic, scenic and natural resources.
- To develop alternate modes of transportation so as to reduce dependence on automobiles.

EXISTING CONDITIONS AND PROBLEM IDENTIFICATION

Two bridges, the Sagamore and the Bourne Bridges, provide the only automobile connection to and from the "mainland". A third "vertical lift" bridge provides a railroad connection to the mainland, with rail lines extending to Dennis and Falmouth. In addition, Cape Cod has two airports with scheduled air service. There is year-round ferry service between Cape Cod and the islands of Martha's Vineyard and Nantucket and seasonal ferry service from Boston to Provincetown.

The main elements of the roadway system are Route 6, Route 6A, Route 28, Route 132 and a network of town roads. Traffic volumes on many of Cape Cod's roads have doubled since the mid 1970s. In some locations, such as at the canal bridges, the summer peak volumes of the 1970s are the average year-round volumes of the 1990s. Out of 339 miles of major roads analyzed for the Long Range Transportation Plan, 78 miles are considered to be operating at or near capacity during peak times.

Much of the Cape's "non-automobile" service is on a limited, seasonal basis. For example, rail service to and from Cape Cod is summer weekend service only. Commuter bus service is provided to and from Boston and some fixed route service is available on Cape Cod on a year-round basis. In addition, local summer shuttle services operate in several Cape Cod communities.

Cape Cod also has a network of bicycle paths and routes. The longest path is the Cape Cod Rail Trail which is approximately 30 miles long and extends from Dennis to Wellfleet. These paths are a viable alternative to automobile travel during the summer, providing access to villages, beaches,

ferries and numerous other destinations.

Still, based on census data, over 85% of Cape Codders commute to work via single-occupant automobiles, well above national averages.

FUTURE CONDITIONS AND PROBLEM IDENTIFICATION

Unfortunately, if current trends continue, traffic conditions will worsen substantially. The acreage of developed residential land doubled between 1971 and 1990. Even so, approximately one-half of the potentially buildable land remained undeveloped as of 1990. Development over the next 30 years could increase traffic congestion considerably. Based on a projected 17% increase in housing units, the miles of congested roads would reach 199 out of 339 miles analyzed. Clearly, critical elements of the road system on Cape Cod are reaching a breaking point.

ENVIRONMENTAL AND OTHER ISSUES

The options to deal with these projections are limited. Cape Cod has a unique, fragile environment. There is limited land available to build additional road capacity. The Cape's sole source aquifer limits the desirability of solutions that will increase storm water runoff. In addition, historic qualities and area character may be seriously jeopardized by building new and wider roads.

Some of the worst air quality readings in Massachusetts have been recorded on Cape Cod. Therefore, roadway improvements that would encourage more vehicle miles travelled (VMTs) and increase automobile emissions may not be acceptable.

RECOMMENDATIONS: PROGRAMS AND PROJECTS

The future of Cape Cod's transportation system is rooted in a number of opportunities and constraints. The new regional perspective offered by the Cape Cod Commission Act and the Intermodal Surface Transportation Efficiency Act provide an opportunity to improve Cape Cod's transportation system. However, financing, land availability, and virtually unmitigatable impacts to water resources and scenic character seriously limit the feasibility of road improvements. The traditional solution of providing an ever-increasing supply of roadway lane mileage is no longer viable. There is a need to explore neglected and new modes and means of moving people including a system of bus, rail, air, and waterborne service to and from the Cape, integrated with an on-Cape system of automobile, bicycle, pedestrian and public transportation facilities.

The Commission is in an ideal position to shape new transportation initiatives to meet the demand for alternate modes of travel. The issues of automobile traffic demand and roadway capacity supply must be addressed so as to:

- Shorten distances between trip origins and destinations by promoting a village-centered settlement pattern;

- Promote safe access to roadways through controlled spacing of curb cuts;
- Promote development patterns which permit traffic improvement measures only where they can be provided without detracting from environmental and scenic resources; and finally,
- Promote alternatives to conventional automobile travel such as public transportation, bicycling and walking, and public/private associations dedicated to implementing commuting and recreational travel alternatives, considering also the needs of the disabled.

The natural beauty, historic character and rural charm of the Cape should not be compromised merely to accommodate more automobile traffic. The mobility that the people of the Cape need and deserve should be consistent with the Cape's historic, scenic and natural resources.

Key projects and programs to be developed include a variety of automobile and non-automobile improvements, such as:

- maintenance of the existing transportation infrastructure
- multimodal transportation center and improved intermodal connections
- additional seasonal and year-round bus service
- additional park & ride lots
- enhanced air service
- improved passenger rail service
- comprehensive bicycle path network and related amenities
- improved use of water for transportation
- travel demand management/systems management strategies
- improved pedestrian amenities
- key intersection and roadway improvement projects
- major road projects, including reconstruction of the Sagamore Rotary and improved access to Hyannis

In conclusion, there is a need to promote alternatives to the automobile while recognizing the continued role of the automobile. The Long Range Transportation Plan for Cape Cod accomplishes this balance. It provides for continued improvements to the road system while developing badly needed alternative modes of transportation.



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CENTRAL MASSACHUSETTS REGIONAL PLANNING COMMISSION (CMRPC) REGIONAL TRANSPORTATION PLAN SUMMARY

The introductory section of CMRPC's 1993 Regional Transportation Plan, or "T-Plan", includes an executive summary of the T-Plan development process followed by a discussion of the Plan's purpose, briefly explaining the requirements and implications of both the ISTEA and CAAA legislation. As part of the explanation, the "15 ISTEA Factors" to be considered within the scope of the T-Plan are specifically listed. Additionally, this section also details the extensive public participation effort utilized throughout the development of the regional Plan.

REGIONAL PROFILE

Within the "Regional Characteristics" section of the T-Plan, a discussion of the area's key socio-economic statistics, including population, housing and employment, is presented. Past trends as well as future year growth projections, based on likely increases in area housing and employment, are summarized. CMRPC's new regional planning initiative, the "Development Framework", designed to help individual communities make sound land use planning decisions in order to coordinate growth on a regional level, is discussed. Also presented are the results of an areawide travel survey of the CMRPC region. The survey provided the basis for deriving regional trip rates and other travel characteristics.

REGIONAL GOALS

The general goals of CMRPC's transportation planning process, as listed in the '93 T-Plan, are as follows:

- Encourage an efficient, economical and safe transportation system.
- Encourage a transportation system that is compatible with the human and natural environment.
- Encourage a coordinated transportation system.
- Establish a transportation system which provides alternatives to the traveler and to the shipper of goods for whatever origin, destination, mode of movement or purpose a trip may have.

EXISTING CONDITIONS AND PROBLEM IDENTIFICATION

The '93 T-Plan addresses, in individual sections, each of the region's major modes of transportation, including highway, public transportation, airports, freight railroads and regional bikeways, trails and pedestrian facilities. Each section is organized in a similar format. After presenting an existing conditions inventory, any current issues impacting the particular mode are identified. Recommendations aimed at optimizing both the present and future operations of the mode, which in many cases cite specific improvements, are summarized. Additionally, the interactions between the region's various modes, where applicable, are also discussed.

The highway section of the T-Plan includes an inventory of the highway facilities serving the region as well as a summary of the traffic volumes recorded on these roadways. Listings of congested highways, high accident intersections and deficient bridge structures are also included. Area trucking activities were inventoried in cooperation with the American Trucking Associations (ATA) Foundation, which voluntarily conducted a survey of the trucking companies operating within the region. Area van pool activity, specifically that of Caravan for Commuters, Inc., is also discussed. Regional pavement management efforts are also included.

The public transportation section focuses mainly on the operations of the Worcester Regional Transit Authority's (WRTA) fixed route and paratransit services, while also including discussions pertaining to both intercity bus and passenger rail. Within this section, the American's with Disabilities Act (ADA) of 1990 is discussed in detail as part of the discussion concerning area paratransit services.

Within the T-Plan's airport section, the operations of the region's commercial and general aviation facilities are examined, with an emphasis on Worcester Municipal Airport. The freight rail section focuses not only on the five freight railroads operating within the region but also on area intermodal activities between the region's rail and trucking industries. Current issues affecting the area's freight railroad's include the designation of the NHS, the impacts of the Cohen Bill, and the Route 146 project. CMRPC's T-Plan also includes a section devoted to the region's existing bikeways, trails and pedestrian facilities. The conversion of abandoned railroad right-of-way to bikeways receives particular attention while the city of Worcester's ongoing Main Street beautification project is also discussed. The financial plan component of the document (while recognized as a first-cut attempt) demonstrates that the funding necessary to implement the transportation improvements in the '93 T-Plan will be available over the 30 year forecast period.

FUTURE CONDITIONS AND PROBLEM IDENTIFICATION

A major component of the T-Plan's highway section focuses on the development and calibration of a regional traffic simulation model using the Quick Response System II (QRS II) software. Housing and employment projections for the benchmark years 1996 and 2020 were used to forecast future year traffic volumes, enabling the identification of roadways where congestion is projected to occur. A number of recommendations are listed which suggest that particular intersections or roadway corridors be studied more thoroughly. Additionally, several potential roadway improvement options have been examined using the model in order to determine, at a regional level, how same options might impact area traffic flows.

The overriding issue facing the region's public transit providers is how to continue existing levels of service under the limited financial resources that are available. In the airport section, on-going improvements at the region's airports are discussed while planned future improvements are also summarized. Regionwide rail issues addressed are the future of the recently established intermodal terminal at Fort Devens, double-stack bridge clearances and right-of-way banking. Several major ongoing projects and proposals, including the Massachusetts Blackstone River Bikeway, the Southern New England Trunkline Trail and the Quinebaug River Rail-Trail are detailed within the Plan's bikeway section.

ENVIRONMENTAL AND OTHER ISSUES

Other transportation issues affecting CMRPC's region, notably air quality, have also been addressed as part of the T-Plan. The air quality section discusses the strategies that will potentially be funded under ISTEA in order to meet the attainment requirements of the CAAA. The requirements of the CAAA and ISTEA as they apply to the region, as well as the guidance received to date from the DEP, MHD and EPA are presented. A number of workable strategies and programs that could potentially play a role in the reduction of the amount of harmful pollutants within the region are identified, including state-wide measures, new technological improvements, a congestion management system, and potential transportation control measures (TCMs).

RECOMMENDATIONS: PROGRAMS AND PROJECTS

CMRPC's 1993 Regional Transportation Plan is the first areawide T-Plan prepared since 1982. Therefore, the '93 Plan was the first attempt to meet the Plan requirements of ISTEA. The two "non-exempt" major projects identified in the '93 Plan are the Route 146 and the Intermodal Transportation Center projects. As the region has been designated a Transportation Management Area (TMA), CMRPC is planning to produce the next full update of the T-Plan in 1996. In the interim, air quality conformity determinations are expected to be based on the projects included within the '93 Plan. Ongoing work activities will contribute substantially to the 1996 update including the various modal components. As examples are the expected outputs from soon to be implemented management systems activities and the currently ongoing CMRPC land use planning initiative, the "Development Framework", which is expected to provide refined inputs to the regional traffic simulation model.

FRANKLIN COUNTY COMMISSION

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FRANKLIN COUNTY PLANNING DEPARTMENT (FCPD) REGIONAL TRANSPORTATION PLAN SUMMARY

The Franklin County Commission drafted and endorsed a Long Range Regional Transportation Plan in 1993 in accordance with the provisions of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. The Plan was updated in July of 1994. This summary will highlight some of the major components of the Plan. The complete document is available and may be obtained by contacting the Franklin County Commission.

REGIONAL PROFILE

Franklin County is the northern most Massachusetts county in the Connecticut River Valley. It borders Vermont and New Hampshire on the north, Berkshire County on the west, Hampshire County on the south and Worcester County on the east. Franklin County's land mass is 725 square miles. The soils within the Connecticut River Valley are ideal for agriculture and the County has a rich agricultural history. More than 56,000 acres of land in 1985 was used for agricultural purposes. Much of Franklin County is rural, 78 percent of the County was forested in 1985. In fact, Franklin County is the most rural county in Massachusetts. The population density in Franklin County in 1990 was 99.8 people per square mile, the least dense county in the state. The county has two population and employment centers: Greenfield/Montague; and the Orange area. 38 percent of the 1990 population lived in Greenfield and Montague and another ten percent lived in Orange, further indication the rural character of the County's surrounding towns.

The total population in Franklin County in 1990 was 70,092. This represents an 18 percent increase in growth from 1970. This is significantly higher than the State's overall growth rate of 6 percent. However, Franklin County has not had an increase in employment opportunities that coincides with the population increase. This imbalance has resulted in Franklin County serving as a bedroom community for the more urbanized regions to our south.

The high growth rate in Franklin County can primarily be attributed to the quality of life which the county offers. Forests and farms predominate the landscape. Undeveloped land, and the scenic beauty of horses grazing and acres of cornfields attract people seeking a more peaceful way of life. Relatively affordable housing with land for a lawn or garden make the area even more idyllic. Access to employment opportunities both within and outside of the county make the county a realistic location to settle. A further contributor to the attraction of Franklin County is an uncongested road network that justifies a longer commute.

It is expected that Franklin County will continue to grow over the next twenty years. The projected population of the county in the year 2000 is 74,849, a 6.8 percent increase. Based on population trends, economic centers and conditions within and outside Franklin County, the population in the County in 2020 is projected to be no greater than 83,000. This represents a 17 percent increase from 1990. These projections are based on the following assumptions: the proposed High Speed Rail line from Springfield to Boston will not be operational by 2020; and there will not be a significant increase in the size of the nearby colleges and universities located nearby in Hampshire County (University of Massachusetts, Amherst College, Hampshire College, Mount Holyoke College and Smith College). If either of these factors change, Franklin County could experience unprecedented population growth.

REGIONAL GOALS

The goals and objectives of the Regional Transportation Plan are designed to provide an overall direction and focus for planning over the next twenty-five years. As such, they are general in nature. Specific goals and projects are included in the Projects and Programs section of this document. The nine goals are as follows:

- Enhance mobility of Franklin County residents by ensuring that residents are able to travel freely and efficiently with transportation alternatives.
- Enhance mobility of goods going through, to and from Franklin County by ensuring that goods and freight can travel through and within the County efficiently and that intermodal connections are available.
- Improve air quality and conserve energy by reducing automobile use and emissions.
- Eliminate and/or mitigate environmental degradation resulting from construction, repair, maintenance or use of transportation facilities by ensuring that water quality and soil stability and integrity are not compromised by the provision of existence of transportation facilities.
- Improve safety by ensuring that County roadways and transportation alternatives are safe.
- Enhance economic development by creating a safe, efficient and comprehensive intermodal transportation network.
- Encourage sensible land use by recognizing the link between an efficient intermodal transportation network and balanced land development.
- Maintain rural character by ensuring that transportation improvements are designed and constructed in ways that enhance mobility and respect and maintain the historic and rural character of roadways, bridges and communities.
- Provide public access to natural resource by ensuring that the general public may

gain access to public water bodies and other natural resource areas.

EXISTING CONDITIONS AND PROBLEM IDENTIFICATION

Franklin County has approximately 1702 miles of roadway of which only 128 miles are classified as urban. The road network is relatively uncongested and there are very few roadways that are at capacity. An annual County growth rate of average daily traffic (ADT) on MHD monitored routes has been calculated at 2.9 percent. Similarly, daily vehicle miles travelled (DVMT) is expected to increase at an annual rate of 2.7 percent. Despite the overall increases in ADT, traffic still flows freely on most roadways in the County. Two trouble spots are Route 2 from Orange to Millers Falls and Routes 5/10 in Deerfield. Route 2 between Orange and Erving is a 2-lane highway that also acts as the main street of Erving and the access and feeder road to Erving Paper Mill. Upgrading this route has been studied at length and several alternatives have been proposed to resolve the traffic and safety issues along this stretch. At this time, consensus has not been reached on the pursuit of any one of the alternatives. Route 5/10 in Deerfield provides access to I-91 in two locations. Yankee Candle, a major employer and tourist attraction is also located on this stretch of road. The MHD is in the process of widening and upgrading this roadway including dedicated turning lanes and providing signalization at three of the major intersections.

FUTURE CONDITIONS AND PROBLEM IDENTIFICATION

A continuing and primary focus of transportation planning within the County will be to identify roads, highways and bridges that are nearing capacity, are congested, unsafe, or are in need of some other kind of improvement. Encouraging alternative modes and expanding the exiting fixed-route system will also be of paramount importance. A combination of travel demand modelling, pavement management, the expertise of County highway superintendents, transit operators and engineers will be used to identify future needs for highway, transit and bridge projects. As projects become priorities they will be added to the TIP. Because there are few capacity problems, we are in the fortunate position of choosing projects that will improve and enhance our current transportation network, rather than resolving problems which currently exist. Projects which will need to be addressed include: Route 2; Route 8A between Plainfield and the Vermont State Line; fixed-route service between the Athol/Orange area and Greenfield; the Franklin County Bikeway; and a number of road projects in Greenfield, Montague and Orange.

ENVIRONMENTAL AND OTHER ISSUES

One of the primary transportation-related environmental issues in Massachusetts is air quality. In a rural region like Franklin County, residents are generally unaware that we have an air quality problem. Our challenge will be to develop effective methods for reducing automobile use, and to educate people about the air quality problem in the County. Specific projects which we will be targeting to address air quality include: bicycle facilities; bike racks on buses; expanded transit service; alternative fuel buses; carpool matching; ride-share program; and expansion of passenger and freight rail within the County.

RECOMMENDATIONS: PROGRAMS AND PROJECTS

The Franklin County Transportation Improvement Program (TIP) outlines the transportation projects which are expected to be initiated over the next three years. Central to the ISTEA tenet of public involvement, it is the TIP that assures that regionally identified transportation improvement projects are prioritized. The following is a list of projects as prioritized by the Franklin County Joint Transportation Planning Committee.

THE MARTHA'S VINEYARD COMMISSION

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MARTHA'S VINEYARD COMMISSION (MVC) REGIONAL TRANSPORTATION PLAN SUMMARY

Martha's Vineyard is the largest of a group of islands lying off the southern coast of Massachusetts. Covering nearly 55,000 acres, Martha's Vineyard possesses a diverse landscape fringed by barrier beaches and fragile wetlands.

Open space is a fundamental aspect of the Island's character. Forests, farms and market gardens that surround villages define rural settings. Sheltered harbors, bays, and ponds support fisheries and wildlife habitats. Coastal scenic and recreation areas attract visitors to the Island.

Farming and fishing, the Island's first industries, gave way to whaling which dominated the local economy especially during the 30 years leading up to the Civil War. In 1866, when speculators began subdividing and selling lots in Oak Bluffs, Martha's Vineyard became a Summer resort. Tourism is now the Island's economic mainstay.

The economy of Martha's Vineyard (as well as on neighboring Cape Cod and Nantucket) is dependent on income brought to the Island by tourists, seasonal visitors, retirees and second-home owners. Despite the vagaries of weather conditions, vacation trends and the state of the nation's economy, Martha's Vineyard has been able to grow and thrive. Future growth, though, if not wisely guided, may jeopardize the Island's attractiveness and the quality of its environment.

Year after year, millions of passengers are carried to and from the Island via ferries and air liners. The Wood's Hole, Martha's Vineyard and Nantucket Steamship Authority which is the Island's "lifeline" provides efficient and effective intermodal regional connections. Increasingly, feeder bus services are extending the mobility of Islanders. Such coordinated services demonstrate the importance of intermodal transportation planning and its role as a bridge between economic and environmental planning.

REGIONAL PROFILE

The year-round population of Martha's Vineyard grew 30% during the 1980s. While 11,600 persons reside on the Island during the Winter, more than 70,000 persons live on Martha's Vineyard during the Summer. Migration rather than natural increase explains the recent population gains. The most significant increase in population has been among young adults between the ages of 20 and 25, and among the elderly who have chosen to retire to Martha's Vineyard. The Island's population is forecast to grow 20% during the 1990s.

One of the effects of population growth and the Martha's Vineyard's popularity as a destination resort is the demand for housing. In 1990, there were 11,600 dwelling units, 40% of which were built

between 1976 and 1990. Only 5000, however, were occupied. Nearly all of the unoccupied dwellings were for seasonal use.

New house construction activity has tended to coincide with those towns - Edgartown and West Tisbury - where population growth during the 1990s was greatest. In relation to the state as a whole and to rural areas, Martha's Vineyard has: a relatively low percentage of year-round housing units dedicated to rental housing, very high median gross rents, and an extraordinarily high percentage of renters who have moved in the past year.

To a large extent, the economy of Martha's Vineyard centers on serving the needs of seasonal residents and tourists. Relative the more rural areas of the state, Martha's Vineyard has: a relatively high concentration of service and retail workers, relatively low annual wages for local jobs, and relatively high unemployment during the Winter. Most businesses are small (employing fewer than 5 employees) and dispersed throughout the Island.

Although, the county's per capita income, \$18,280, exceeds state wide norms, the high cost of living on Martha's Vineyard erodes the purchasing power of family incomes.

REGIONAL GOALS

Three dominant themes echo throughout the Regional Transportation Plan for Martha's Vineyard:

- The regional transportation system must enhance the mobility of Islanders and accommodate seasonal travel patterns.
- Transportation projects to be chosen by Islanders will be, first and foremost, choices concerning environmental quality and economic development.
- The Island's transportation system is, indeed, an intermodal system.

EXISTING CONDITIONS AND PROBLEM IDENTIFICATION

The regional goals emerged from a review of development trends. The Island's rapid development in the 1980s was perceived by many year-round and seasonal residents as a very serious problem threatening fragile natural resources and straining municipal services. Along with the other planning issues, the following key transportation issues were defined:

- Congestion is an increasing problem in the Edgartown, Oak Bluffs and Tisbury business districts.
- Different modes of travel must be accommodated within the existing road network.
- New development must be coordinated with the capacity of the road system and should be located to minimize traffic and parking problems.

- Since access to regional attractions is lacking for many Island visitors, a convenient and efficient transit system is needed.

FUTURE CONDITIONS AND PROBLEM IDENTIFICATION

The development of Martha's Vineyard depends on mobility and access. Yet, enhanced access must not compromise the Island's fragility - vulnerable ground and surface waters, woodlands and wetlands which provide wildlife habitats, and an irreplaceable rural character. Regional transportation system improvements are essential elements in the Island's growth management strategy.

Regional transportation needs straddle conflicting viewpoints. For example, traffic flows evenly and safely on many of the Island's roads. But, Seasonal traffic flows burden major roads and disrupt the Island's "quality of life." Determining the proper mix and timing of regional transportation improvement projects is an on-going process directed by the Martha's Vineyard Joint Transportation Committee (JTC).

The JTC has formulated a Transportation Improvement Program (TIP) for the Martha's Vineyard region. Overall, the TIP outlines projects related to the Island's growth management strategy, promoting the efficient use of the existing regional transportation system and reducing the number of vehicle trips in order to manage seasonal traffic congestion.

Congestion management is one of several management systems cited in the Intermodal Surface Transportation Efficiency Act of 1991. The Regional Transportation Plan for Martha's Vineyard lists 48 interim proposals that should be followed in order to manage various management systems, such as: roads and bridges, road safety, public transportation facilities as well as intermodal transportation facilities.



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**MERRIMACK VALLEY PLANNING COMMISSION (MVPC)
REGIONAL TRANSPORTATION PLAN SUMMARY**

The 1993 Merrimack Valley Regional Transportation Plan (RTP), identifies the transportation needs of the region and outlines projects, programs and proposals to meet these needs. The RTP is designed to identify the long-term problems that will confront the region's transportation system. It includes the land use, socioeconomic, environmental and other considerations that largely shape transportation demand and the transportation network. The RTP also recommends either possible solutions to the identified problems/needs or a definition of what types of further analysis must be undertaken to determine the most appropriate solution. The RTP is one of the requirements of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA).

Much of the work involved in developing the Regional Transportation Plan centered on gathering information on existing transportation conditions. This involved compiling regional data on employment, population, income, households and many other socioeconomic factors, as they directly influence the demand for transportation services in the Valley. MVPC staff also gathered data on the region's airport, transit, railroad, port, and bikeway/pedestrian facilities. The condition of the existing highway system was evaluated, which included identifying structurally deficient bridges, hazardous intersections, and roadways overburdened by traffic.

A list of transportation goals and objectives were developed that reflected the problems found in the analysis of existing conditions. In order to meet these goals, a variety of alternatives were evaluated. Long range implications of transportation projects were addressed, including air quality conformity determinations and funding plans.

REGIONAL PROFILE

The Merrimack Valley Planning Region is located in the northeastern corner of the Commonwealth and is traversed by the Merrimack River, which has played a key role in the region's history and economy. MVPC's jurisdiction encompasses fifteen Essex County communities as follows:

Three central cities of *Haverhill, Lawrence and Newburyport.*

Four suburban communities whose centers developed around formerly active mills - *Amesbury, Andover, Methuen and North Andover.*

Eight rural towns located east and south of Haverhill - *Boxford, Georgetown, Groveland, Merrimac, Newbury, Rowley, Salisbury and West Newbury.*

The Merrimack Valley has a long history as one of New England's earliest and most important industrial regions, as the Merrimack River provided early river transportation, commercial fishing and shell fishing, water-based recreation and water power for mills. Overall, the region has experienced the rise and fall of three different economic cycles: shoe manufacturing and textiles, defense related industries, and non-defense related high technology.

REGIONAL GOALS

The following transportation goals - consistent with the provisions of ISTEA - were outlined in the Regional Transportation Plan:

- Promote the development of a regional transportation system that maximizes the interconnective use of all modes of goods and person transportation in the Valley
- Develop programs and services which increase transit and paratransit usage
- Maximize the efficiency and integrity of existing highway and transit systems
- Improve the quality of the environment in the Merrimack Valley by promoting projects and programs that help the region to meet all federal air and water quality standards
- Eliminate safety problems that exist on the region's transportation system
- Promote zoning and land use regulations which are consistent with the region's transportation goals
- Undertake efforts to eliminate congestion on the region's transportation system.

EXISTING CONDITIONS AND PROBLEM IDENTIFICATION

The region's 15 cities and towns are well served by an excellent highway network with over 1,400 miles of roadway. Interstate highways 93, 95 and 495 traverse the region, providing vehicular access north, south and west. Both I-93 and I-95 link the region with Boston to the South. I-93 extends north to Manchester and Concord, New Hampshire. I-95 extends north to Portsmouth, NH and Portland, Maine. I-495 is a circumferential roadway that crosses every major highway in eastern Massachusetts. At least one of these three interstates passes through 14 of the region's 15 communities.

The region receives a wide array of public transportation services from both public and private sources. These services include local and long distance bus routes, elderly and disabled services, taxi services, and commuter rail services that link the region to Boston. The Merrimack Valley Regional Transit Authority (MVRTA) is the primary provider of public transportation in the region.

Sixty bridges in the region have been identified by the MHD as being structurally or functionally deficient. The MVPC Regionwide Systems Performance Study (RSPS) identified 37 intersections in the Valley as having potential safety problems. The RSPS also identified 39 roadway segments that are experiencing capacity or congestion problems. These include Routes 93 and 495, the region's most heavily used roadways.

Many of the RTP's recommendations are geared toward solving these current problems, which follows ISTEA's emphasis of improvement and better utilization of existing transportation facilities.

FUTURE CONDITIONS AND PROBLEM IDENTIFICATION

A transportation model developed by the Central Transportation Planning Staff was used to project future traffic growth in the region. This model identified 12 roadways as growing by over 50% from 1990 to the year 2020. Emphasis will be given to identifying means of reducing demand on these roadways and improving their efficiency.

Requirements of the Americans with Disabilities Act (ADA) will severely limit the MVRTA's ability to initiate any new fixed route bus services in the foreseeable future. The Authority must devote substantial resources in providing complementary paratransit service for elderly and disabled individuals who are unable to use the existing accessible fixed route buses.

Increased diffusion of employment and residential growth in eastern New England make it increasingly difficult for traditional transit services to function effectively. Consequently, the RTP recommends that the MVRTA investigate the feasibility of introducing generally available demand response services in less densely developed sections of its service area to supplement existing fixed route services.

ENVIRONMENTAL AND OTHER ISSUES

Air quality issues have become increasingly important due to recent legislation. The Clean Air Act Amendments of 1990 (CAAA) mandate that the Massachusetts regions' Transportation Plans and TIPs must contribute to reductions in annual mobile source emissions and must maintain consistency with the SIP for air quality. In an effort to meet these requirements, quantitative air quality analysis of projects is conducted by the MVPC where necessary and the results are included in the RTP. In addition, MVPC's regional traffic model has been used to obtain regionwide estimates of present and future vehicle emissions levels.

Water quality issues remain important as well. The untreated runoff from roadways poses a major threat to water quality. Runoff contains residue from tail pipe emissions, hydrocarbons from engine leaks and spills, as well as road surface materials such as asphalt. These pollutants can combine to produce high levels of certain toxic metals and nutrients. Current roadway construction practices emphasize the rapid removal of water from road surfaces for safety reasons. This process usually does not allow for pollutants to be naturally cleansed from the runoff stream. To the extent feasible, the RTP recommends that best practices for stormwater management be followed in the construction of transportation projects.

RECOMMENDATIONS: PROGRAMS AND PROJECTS

Many of the recommendations contained within the RTP consist of various transportation demand and control measures. These measures will be considered and studied on a regionwide scale to address the problems of congestion, safety, air quality, mobility, maintenance and economic development. Some of these measures include:

- programs for improved public transit
- use of high occupancy vehicle lanes
- employer-sponsored programs to permit flexible work schedules
- employer-based transportation management plans, including incentives
- traffic flow improvement programs that achieve emission reductions
- fringe and transportation corridor parking facilities for carpoolers and transit users
- programs to limit or restrict vehicle use in downtown areas during periods of peak use
- programs for the provision of all forms of high-occupancy shared-ride services
- programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas
- programs and ordinances to facilitate non-automobile travel, provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel
- programs for new construction and major reconstruction of paths, tracks or areas solely for the use by pedestrian or other non-motorized means of transportation when economically feasible and in the public interest
- parking pricing program involving either charging the solo driver more money for parking or discounting parking charges for carpoolers
- employer-sponsored telecommuting program to allow employees to work-at-home while linked to the work place through the use of a computer and modem

Projects and programs (both proposed and approved) are listed within the Long Range section of the RTP. The Transportation Systems Facilities Plan lists bridges in need of replacement/repair, and provides an extensive listing of other proposed and approved transportation projects throughout the region. These projects include roadway resurfacing, reconstruction, intersection improvements, parking and pedestrian facilities, and MVRTA operating assistance. The Air Quality Conformity Determination section outlines the requirements for conformity with the CAAA and demonstrates how they are being met. The Financial Plan discusses funding sources and outlines general funding mechanisms for various projects in the RTP.

The 1993 Merrimack Valley Regional Transportation Plan should not be thought of as a static document which will lock the region into a specified course of action in meeting local and regional transportation needs. The MPO fully recognizes the fact that as the region changes over time, so will its transportation demands and needs. In addition, projects which are planned today may reach roadblocks in the implementation stage that will affect the scheduling and funding for all projects.

New data on the status and condition of the regional transportation network will become available on an ongoing basis. It is anticipated that the RTP will be significantly updated in the coming years.



MONTACHUSETT

REGIONAL PLANNING COMMISSION

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MONTACHUSETT REGIONAL PLANNING COMMISSION (MRPC) REGIONAL TRANSPORTATION PLAN SUMMARY

The Montachusett Regional Planning Commission (MRPC) is composed of 22 communities of approximately 675 square miles located in northern Worcester County and western Middlesex County. Fitchburg, Leominster and Gardner, the major urbanized areas, comprise the largest communities in the region.

REGIONAL PROFILE

The Montachusett Region consists largely of rural areas, with industrial centers located in the three cities of Fitchburg, Gardner and Leominster as well as in the towns of Clinton, Ayer and Athol.

The dominant employment centers in the Montachusett Region are Fitchburg and Leominster, comprising over 1/3 of the total employment in the area. Region-wide, manufacturing remains the region's largest employer despite the almost 30% decline in jobs since 1970. As consistent with the rest of Massachusetts, service and wholesale/retail jobs are increasing. With this shift in employment has come an accompanying employment migration from the traditional urban areas of the region to the less dense communities. Many of these new employment centers are less centralized, dispersing traffic to new areas and also creating problems for non-auto transportation.

Within the region, land use patterns, as expected, reflect the urban or rural characteristics of the communities. There is a greater percentage of acreage devoted to high-density residential, industrial and commercial in the urban areas. However, several rural member communities have conducted zoning changes to encourage commercial and industrial activities in their towns in an effort to increase their tax base and produce jobs and services. Although these communities desire greater economic activity, they still want to maintain the rural nature of their towns. Revitalization of the downtown areas of Fitchburg, Leominster and Gardner is a major economic concern for the municipalities and the region as a whole.

REGIONAL GOALS

To provide a safe, reliable multi-modal transportation system throughout the Montachusett Region for the movement of all peoples and goods, to formulate strategies to attain and maintain National Ambient Air Quality Standards, and to seek appropriate funding mechanisms in order to implement policies and objectives.

To improve the transportation system to accommodate passengers and goods between Boston, the Worcester metro area and the three cities located in the region. Special emphasis should be given for multi-occupant vehicles and the public transit system.

EXISTING CONDITIONS AND PROBLEM IDENTIFICATION

The Montachusett Region is served by several state numbered routes that provide accessible links to all of the region's communities. Maintenance, preservation, and improvements to the existing highway infrastructure are of considerable importance to the region. It is anticipated that continued repaving and reconstruction work, as well as intersection and signal timing improvements will improve traffic flow throughout the region.

Of great importance to the region are the two major limited access highways in the region. Route 2 is the main east-west state highway that runs from Boston to I-91 in Greenfield and eventually to New York state, and is one of two major contiguous highways through the Commonwealth. Improved or alternative connections between Route 2 and the downtown Fitchburg and Leominster areas near Routes 12 and 13 are major regional considerations. Presently, Route 2 is only a four lane divided highway east of the Phillipston/Templeton town line. MRPC is interested in improving Route 2 as a four lane divided highway all the way from I-495 to I-91 in order to serve as a parallel east-west connector to I-90 (Massachusetts Turnpike). I-190 is the other major limited access highway. It runs north-south from Route 2 in Leominster to I-290 in Worcester and the Massachusetts Turnpike.

There are over 350 bridges in the Montachusett planning area. The efficient movement of goods and people are reliant upon the condition of these structures. The Executive Office of Transportation and Construction (EOTC) has identified 60 of these as being structurally deficient. Some of these are in dire need of repair.

The trucking industries operating in the Montachusett region have identified problem areas specific to their activity. They include bridge clearance or weight restrictions that force drivers to take inconvenient routes; unavoidable intersections which are difficult to negotiate, with detours taken due to difficult locations; and steep grades where the addition of a climbing lane would be helpful. Inadequate supply of truck loading space in downtown areas is also a major concern. In the downtown areas of the Montachusett region there are very few alleys so most deliveries are made from the curb, regardless of whether legal parking space is available.

Increasing concern for air quality and energy conservation is leading to renewed interest in development of adequate facilities for bicycles throughout the Montachusett region. There has been a noticeable increase in the number of bicycles around population centers and on the highways. This has resulted in obvious bicycle safety problems with increased bicycle-automobile accidents. Region-wide there is strong support for designated bikeways for recreation and commuting.

The cities of Fitchburg, Leominster and Gardner have fixed route bus services administered by the Montachusett Regional Transit Authority (MART). Fitchburg and Leominster have three trunk lines between the two cities, six intercity routes in Fitchburg and three intercity loops in Leominster. There are also two routes in Gardner running in opposite directions over the same loop circumscribing

the city. Interstate bus service is limited to two companies providing minimal service to the region. MART also manages numerous paratransit operations including a Special Needs program, medical assistance programs, an Early Intervention program, Council on Aging paratransit and ADA complementary van services. MART also acts as a broker for home care, day care and other human services agencies.

Commuter rail service in the Montachusett Region consists of approximately fifty-four round trips weekly on the Fitchburg line to North Station in Boston. MART and MBTA are combining their efforts to locate an Intermodal facility in Fitchburg to serve regional commuters.

There are three railroad companies currently operating freight lines in the Montachusett Region. Guilford Transportation Industries (GTI) is the largest operator of freight lines in the region. It operates on a number of lines including those connecting the Moran Terminal in Charlestown to Mechanicville, New York. Consolidated Rail Corporation (Conrail) operates one line running from Fitchburg to Clinton. The Providence and Worcester Railroad Company (P&W) operates a line from Gardner to Hubbardston, eventually halting in South Worcester.

Within the Montachusett Region, there are four municipal airports. The Fitchburg Municipal Airport is by far the largest, with two fixed base operators (FBOs) located there. Although it is geographically close to Route 2, access to the airport can be confusing and is subject to traffic problems along Routes 12 and 13. The remaining airports, Gardner Airport, Sterling Airport and Shirley Airport are general aviation airports for sport and/or recreation and not for the movement of goods or freight. Presently, the Moore Army Airfield at Fort Devens in Ayer is limited to support of military flights. With the closing of the Fort Devens base in 1995, this airfield has a questionable future. Access to the airfield is via Route 2A, with commuter rail currently stopping in Ayer approximately one mile away presenting a possible future intermodal connection.

FUTURE CONDITIONS AND PROBLEM IDENTIFICATION

Projections for region-wide highway transportation characteristics were examined and compared to base year values using the QRS II travel demand model. Forecasts for future years were influenced by the changes to demographic and economic parameters, as well as the anticipated land use changes due to the closing of the Fort Devens Military Base in 1995.

With the closure of the Fort Devens Military Base, it has been estimated that there are approximately 4,400 acres of land available for development. A probable scenario of five developments was created for analysis purposes. They include a multi-modal inland port-freight distribution center expansion, a U.S. Federal prison hospital, a Federally-funded Job Corps site, construction of a industrial/business/manufacturing complex, and the continued presence of the Army Reserve Enclave and the Army Corps of Engineers.

Infrastructure maintenance, i.e. bridges and roads will continue to be a major concern of the Montachusett region.

Transportation improvements to both Routes 12 and 13 and their connections to Route 2 must be considered to relieve serious congestion problems along these routes.

Support of the MART transit system will need to be continued in order to serve transit dependent persons. Improvement of the public transit connection between the region and Boston and Worcester Metro area is also needed.

The promotion of multi-occupant vehicles for commuting inter and intra regionally is needed.

ENVIRONMENTAL AND OTHER ISSUES

It is the intent of the Montachusett Regional Transportation Plan to promote the integration of transportation planning with environmental, land use, and energy conservation concerns.

The Montachusett Regional Transportation Plan is fully coordinated with the State Implementation Plan (SIP) to ensure projects which demonstrate air quality benefits, and represent a substantial element in the planning process.

Clean water in the Montachusett Region is one of its most valuable natural resources. To maintain pristine waters where they exist and improve conditions where they are substandard, pollution control through stormwater management should be implemented.

Protection and preservation issues such as avoidance, mitigation and compensation for wetlands impacts must be included in the process of designing and maintaining transportation infrastructure. Along with these measures, the plan also seeks to identify enhancement programs that will contribute to a healthier, attractive environment.

MRPC has a broad objective to reduce energy consumption in the transportation sector. Decisions and recommendations which are channeled through the regional planning process can have a positive impact on energy conservation by reducing vehicle miles traveled (VMT). Transportation system efficiency in passenger and freight movement can also lead to energy savings.

RECOMMENDATIONS : PROGRAMS AND PROJECTS

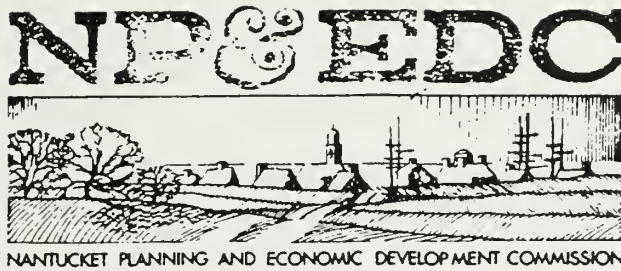
- Seek funding for reconstruction and rehabilitation of existing highways and bridges as identified in the Short Range section of the Montachusett Regional Transportation Plan.
- The planned closure of Fort Devens in 1995 will significantly impact the Montachusett region. The best re-use of Fort Devens area should be encouraged in order to lessen economic impacts and promote the region.
- Continued support for the MART transit system is needed. Operations should be expanded as necessary with consideration of special services to Boston and the Worcester metro area.
- Seek commuter rail improvements to the Fitchburg Intermodal Center and Commuter Rail Station.

- Promote and support additional bicycling and walking trails to augment existing transportation facilities. These means of transportation are recognized as a viable alternative to transit and auto use.
- Support the goals and ideas of ISTEA that promote stronger local input in the identification, development and prioritization of transportation projects and improvements.
- The following three roadway projects are recommended for further study:

Route 2: Improvement and upgrade of Route 2 from the Phillipston/Templeton Town Line to I-91 in Greenfield to a four lane divided highway. Presently, Route 2 goes from a four lane divided highway to a two lane undivided highway at this location.

Route 13 Connector: Construction of a long range alternative to improve traffic flow and lessen congestion along the present Route 13 layout in Leominster and Lunenburg.

Fitchburg Connector: Construction of a long range alternative which would improve access to and from Route 2 in a more timely and efficient manner.



NANTUCKET PLANNING AND ECONOMIC DEVELOPMENT COMMISSION (NPEDC) REGIONAL TRANSPORTATION PLAN SUMMARY

Nantucket is an island of 49.53 square miles located 25 miles off the south shore of Cape Cod. Two sparsely populated barrier islands, Tuckernuck and Muskeget, lie to the west of the principle Nantucket island. Nantucket has unique geographic and natural characteristics, consisting of barrier beaches, and fragile inland and costal wetlands. The Island is also home to a diverse mix of wildlife and plant habitats, some endangered.

In 1966, all of Nantucket was designated a National Historic Landmark, and in 1970 became a local Historic District. The Historic District Commission was created to oversee the district which contains over 400 historic dwellings, erected between 1750 and 1850.

Tourism is the base of Nantucket's economy. Protection of Nantucket's natural and historic resources are vital to maintaining the Island's attraction as a tourist destination and to its resource-dependent industries such as shellfishing.

Transportation management plays an essential role in Nantucket's future. The Island must maintain its historic character and still provide a safe and efficient means for visitors and residents to travel around the Island. Traffic gridlock now threatens Nantucket's downtown aesthetics and character that tourists and residents appreciate.

REGIONAL PROFILE

Nantucket has a year-round population of 6,012 residents (1990 U.S. Census). During the summer tourist season, from July 4th to Labor Day, the population can grow to 40,000 people (NP&EDC, Open Space and Recreation Plan, 1992).

A majority of the houses on Nantucket are second homes with only 20% occupied year-round (Town of Nantucket Assessor's Office). Between 1970 and 1990, the number of housing units on Nantucket increased by over 100%. There are 2597 year-round households on Nantucket. Increasingly, residential construction has occurred in outlying areas necessitating greater use of vehicles to travel to centrally located commercial and institutional uses.

Nantucket's tourism economy generates an estimated \$40 to 45 million annually (Nantucket Chamber of Commerce). Retail and service industries comprise almost half of Nantucket's labor force. Construction, fishing and shellfishing industries are also important to Nantucket's economy (Economic Base Analysis, 1993).

The median household and median per capita incomes for Nantucket County although higher than those of the State are offset by significantly higher cost of living on the Island (housing, food, off-island travel, gasoline, electricity and home heating oil).

REGIONAL GOALS

In November 1990 the **Goals and Objectives for Balanced Growth** was adopted by a vote of Nantucket Town Meeting. The broad transportation goal is: *To provide a transportation system that will move people and goods to, from, and around the Island in a way that is safe, convenient, economical, and consistent with the Island's historic, scenic, and natural resources.* The plan recognized the many specific objectives of this effort which are identified in the proposed solution section.

EXISTING CONDITIONS AND PROBLEM IDENTIFICATION

The airport provides direct air links to Boston, metropolitan New York City (Newark, NJ), Hyannis, and Martha's Vineyard. Classified as a "principal arterial highway", the Steamship Authority operates the primary passenger and freight ferry service between Nantucket and Hyannis year-round. Privately owned, Hy-Line Cruises, also provides passenger only service between Nantucket and Hyannis from May through October, and limited service between Nantucket and Martha's Vineyard.

Nantucket's 137.37 road network consists of roads, 23.36 miles of rural major collector, 15.02 miles of rural minor collector, and 98.99 miles of rural functional classification local. There are four major completed bike paths on the island totaling 17.5 miles of separate bicycle facilities: Milestone Road, Surfside Road, Madaket Road, and Cliff Road. The 8.2 mile Polpis Road bikepath is currently progressing towards the commencement of construction in the spring of 1995. There is currently no public bus systems operating on Nantucket although private sightseeing and seasonal shuttle buses are operational. Within town, walking is an important and efficient mode of transportation.

Traffic congestion poses an immediate threat to Nantucket's historic core district. Often during the summer season, the downtown is gridlocked with vehicles, bicycles, mopeds and pedestrians competing for a limited amount of space. Visitors must depend on private automobile, taxi cabs, or the limited private shuttles for vehicular transportation to outlying areas. Public transportation on the Island is non-existent, hindering mobility on the Island.

Many of Nantucket's streets were not laid out to accommodate heavy traffic and pose safety concerns for automobiles, bikes, pedestrians and mopeds. Additionally, many of Nantucket's narrow brick sidewalks pose obstacles to accessible pedestrian routes such as uneven grade and lack of curb cuts to accessible pedestrian routes.

FUTURE CONDITIONS AND PROBLEM IDENTIFICATION

Based on a detailed review of population and housing trends from the past twenty years, the

Nantucket Planning & Economic Development Commission staff estimates that between 2700 (low growth) and 4100 (high growth) new homes could be built by the year 2010.

Currently, there are 1.56 vehicles per unit (1990 U.S. Census) and according to the slow growth scenario 135 additional units per year would add an additional 211 vehicles per year, which equals an additional 4212 vehicles by 2010. The scenario for more intensive growth would mean an additional 6396 vehicles on the island, a 157.6% increase over a twenty year period.

The Steamship Authority has projected increases in passenger, automobile and truck traffic between 1992 and 2012. The projected increases are 54.98%, 15.68% and 45.34% respectively. The passenger traffic increase translates into an additional 266,057 pedestrians coming to Nantucket annually.

ENVIRONMENTAL AND OTHER ISSUES

As outlined above, Nantucket has many unique and fragile land areas such as moors, heathland, dunes, barrier beach and geographical formations. The careful stewardship of these natural features are a priority when implementing transportation improvement priorities. Also, Nantucket is often subject to coastal flooding and shore erosion. Therefore, transportation improvements must carefully address the impacts of flooding and/or potential soil erosion.

RECOMMENDATIONS: PROGRAMS AND PROJECTS

Nantucket's transportation objectives and policies are committed to encouraging non-motorized modes of transportation. The following solutions have attempted to consider alternatives with the least detrimental environmental impact.

Road Facilities

- Intersection and road improvements to correct dangerous intersections, roadway widths, curbcuts, etc.
- Re-examine the existing traffic circulation pattern (one-way streets, etc.) to determine whether it is the most efficient and effective to move traffic around and through the downtown
- Encourage a State legislative policy (i.e., Home Rule Petition) to allow Nantucket to enforce lower speed limits

Bicycle Facilities

- Update and continue to implement Nantucket's Bikeway Master Plan

- Install a comprehensive system of signs for the Island's bike routes
- Require new development to provide facilities such as bike storage, easements for future bikepaths, etc.
- Implement bicycle safety and registration programs

Pedestrian Facilities

- Redesign sidewalks, curbing and pedestrian infrastructure to meet pedestrian access needs
- Widen sidewalks in heavily trafficked areas
- Coordinate street furniture, poles, utilities, etc. to prevent barriers to pedestrian flow
- Encourage walking by establishing marked routes to historic attractions
- Install safety and directional information signs
- Distribute promotional information to encourage walking, bicycling and use of shuttle buses

Parking Facilities

- Redesign existing parking spaces to minimize traffic flow interruptions
- Implement a seasonal downtown parking sticker system
- Increased parking facilities at Surfside and Madaket Beaches
- Provide boat ramps and on-shore parking facilities for recreational boaters

Public Transportation

- Establish a seasonal shuttle bus system
- Improve the links between pedestrian movements and other modes of mass transportation
- Ensure that adequate transportation service is provided to the elderly and handicapped

- Coordinate off-island bus and train schedules with the ferry arrival and departures

Off-Road Bicycling and Walking Facilities

- Provide safe access to beaches through the construction of stairways, trails, etc.

Airborne Facilities

- Provide increased airline connections to regional cities
- Complete a bike route to the airport
- Ensure that airline fees are reasonable
- Improve roadway infrastructure serving the industrial areas surrounding the airport
- Develop a separate freight landing facility at the Nantucket Airport
- Examine ferry and airfare rates and policies for fairness with regard to year-round residents' medical and other necessary trips to the mainland

Waterborne Facilities

- Restrict future increases in vehicular carrying capacity on the Steamship Authority's ferries
- Redesign the Lower Broad Street gateway to Nantucket from the Steamship Wharf
- Improve intermodal access (taxis, shuttle buses, etc.) to the ferries
- Provide better separation of vehicles and pedestrians at the Steamboat Wharf
- Explore strategies to reduce emissions of volatile organic compounds (VOC) from recreational boats
- Examine the feasibility of separate waterborne freight loading and storage facilities



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Northern Middlesex Council Of Governments

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NORTHERN MIDDLESEX COUNCIL OF GOVERNMENTS (NMCOG) REGIONAL TRANSPORTATION PLAN SUMMARY

The Long Range Transportation Plan is an overall planning document which identifies and analyzes transportation infrastructure and service improvements that will be needed in the Northern Middlesex area through the year 2020. The geographic area covered by the plan includes the Towns of Billerica, Chelmsford, Dracut, Dunstable, Pepperell, Tewksbury, Tyngsborough, and Westford, and the City of Lowell.

The Plan is the first long range plan for the region developed since the enactment of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). The Plan includes new policies and goals which reflect the spirit and intent of ISTEA.

Under the provisions of the Intermodal Surface Transportation Efficiency Act of 1991, the plan includes the following elements:

- Methods to preserve existing transportation facilities and to improve the existing transportation network;
- The effect of transportation policies on land use and development;
- The consistency of transportation plans with the provisions of state, local and regional short and long term development plans;
- Access to intermodal transportation facilities, freight distribution routes, cultural and recreational resources, and population and employment centers;
- Alternative transportation modes;
- The overall social, economic, energy and environmental consequences of transportation decisions;
- The use of life-cycle costs in the design and engineering of bridges and pavements;
- Methods to expand transit services and to increase use of such services as well as capital investments in security for transit systems;
- Development of the Plan has also been coordinated with the State Implementation Plan for Air Quality, the requirements of the Clean Air

Act Amendments of 1990 and the Americans with Disabilities Act.

- Opportunity for public review and comment has been provided throughout the plan development process in accordance with the Public Participation Plan prepared by the Northern Middlesex Council of Governments.

REGIONAL PROFILE

The Northern Middlesex area, composed of the central City of Lowell and eight surrounding towns, is located in the northeaster part of Massachusetts, bordering the State of New Hampshire. Three major highways, Route 3, I-495, and I-93, cross and adjoin the region, providing excellent linkage to the Route 128 belt and Metropolitan Boston, the Lawrence- Haverhill area, and other areas of Eastern Massachusetts and Southern New Hampshire. The current population of the region is approximately, 263,659 persons, based on the 1990 U.S.Census.

During the last three decades, the construction of the highway system along with the suburbanization and outward expansion of the Metropolitan Boston region northward have resulted in significant growth and development in the region's southern towns (particularly Billerica, Chelmsford, and Tewksbury). Beginning in the 1980s, as large tracts of undeveloped land became scarce in the urbanizing southern communities, the outlying communities of Tyngsborough, Westford and Pepperell experienced tremendous growth.

Employment patterns in the Northern Middlesex Region have shifted from a traditional manufacturing base to an economy based more on retail and services. This trend is expected to continue through the 1990s.

REGIONAL GOALS AND OBJECTIVES

The general transportation goal of the Long Range Plan is to develop a balanced, multi-modal, cost-effective, transportation system connecting points inside and outside the Northern Middlesex region. The plan also strives to:

- Provide safe and convenient transportation service to all area residents, especially the transit dependent groups such as the elderly, low income, and disabled;
- Maximize energy conservation, improve air quality and minimize traffic congestion; and
- Encourage development patterns consistent with local and regional land use policies.

In order to achieve these goals the following objectives have been adopted in the Plan:

- Improve, maintain, and preserve the existing transportation system and infrastructure
- Increase integration and connectivity between the various transportation modes
- Reduce congestion on existing facilities
- Provide equal accessibility to people with disabilities
- Provide equitable service to all residents
- Provide safe and secure transportation facilities
- Encourage development in areas most suitable and well served by existing transportation services and infrastructure, as is consistent with local and regional land use policies
- Promote transportation improvements that enhance and foster economic development
- Plan, design, construct, operate, and maintain the regional transportation system in a manner which is environmentally sound
- Minimize the use of energy resources

EXISTING CONDITIONS AND PROBLEM IDENTIFICATION

In order to develop a transportation plan that will solve the majority of transportation problems, minimize the social, environmental and economic adverse impacts, have implementation costs in line with anticipated funding levels and function as a comprehensive, intermodal transportation network, it is necessary to technically analyze the operating conditions of the overall transportation network. This analysis has been conducted utilizing a computerized travel demand model, the Highway Emulator.

In addition to the computer modelling effort, existing transportation problems have also been identified through various technical studies performed by the NMCOG staff, as well as through input from the Lowell Regional Transit Authority, the State transportation agencies, the local communities, and the public participatory process.

FUTURE CONDITIONS AND PROBLEM IDENTIFICATION

Future traffic and other transportation needs have been projected through the year 2020. In addition to studying conventional highway and transit projects, the Plan investigates and evaluates the use of alternative forms of transportation such as pedestrianism and bicycling. The Plan also discusses the use of transportation demand management strategies such as ridesharing, flextime, telecommuting, and trip reduction ordinances.

ISTEA requires that each state implement six management systems to further identify and detail transportation needs by 1995. These management systems include: pavement, bridges, intermodal, congestion, public transportation, and safety. The implementation of these management systems will provide a primary source of data and information on which to base future planning decisions. Therefore, management systems will provide much of the framework for future refinement of the Plan.

ENVIRONMENTAL AND OTHER ISSUES

The projects included in the transportation plan have been analyzed to ensure that they will have positive air quality impacts. The region's planning process has been conducted in accordance with the conformity regulations set forth by the EPA. These regulations set forth the approach which is to be used in each step of the process of planning, programming and implementation, including the technical aspects involved in modelling the projects' air quality impacts.

Under the provisions of ISTEA, the Long Range Transportation Plan takes on new importance in that all future transportation projects which are funded in part or wholly with federal monies must be included in the Plan. Continuing effort is required to adjust, refine and update the Plan as necessary in order to remain directed toward achieving the most desirable transportation system for the region. The Plan, therefore, is not a static document, but an ever evolving guide to the existing and future transportation needs of the region.

RECOMMENDATIONS: PROGRAMS AND PROJECTS

Presently, there are no park and ride lots located within the region. The Plan advocates providing a park and ride lot along the Route 3 corridor and the I-495 corridor. The Plan also identifies the need for additional parking capacity at the Lowell commuter rail station which is currently nearing capacity, and in fact, is over 100% occupancy during the fall and winter months.

Of all the highway projects evaluated in the Plan, two regionally significant projects have been shown to have the greatest benefit to the regional transportation network: the Route 3 Improvement Project and the new permanent crossing over the Merrimack River in Lowell. Both of these projects would not only alleviate major traffic congestion problems, but would also have tremendous economic benefit to the region. By reducing traffic congestion, delay, and air pollution, both projects would serve to make the area more attractive to business, in terms of future locational decisions.

There are a number of transit related projects identified in the Plan. Most of these projects fall into the categories of service improvement and expansion, with capital and operating funding a necessary prerequisite to implementation. All of these projects will be developed with special attention to the intermodal emphasis of ISTEA and the requirements of ADA.

The Plan also advocates the increased development of facilities and programs to promote the use of alternative forms of transportation such as cycling and walking.

During the upcoming year, the Plan will continue to be refined based on the development of

management systems, improvements in the computerized regional travel demand model, and requirements of the Clean Air Act. The public participatory process will continue to play an important role in the development of the refined Plan. Public input is crucial in the consensus building and educational process so vital to the successful implementation of the Plan.

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OLD COLONY PLANNING COUNCIL (OCPC) REGIONAL TRANSPORTATION PLAN SUMMARY

Federal law requires that all metropolitan areas prepare a long-range transportation plan. The Old Colony Planning Council plan must be formally adopted by the Metropolitan Planning Organization (Executive Office of Transportation and Construction (EOTC), Massachusetts Highway Department (MHD), Brockton Area Transit Authority (BAT), and Old Colony Planning Council (OCPC)) by December 1994. The most recent regional Transportation Plan was completed in 1993. Passage of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), the Clean Air Act Amendments of 1990 (CAAA) and the Americans with Disabilities Act of 1990 (ADA) requires an evaluation of the OCPC region's transportation goals, policies, fiscal resources and project priorities. This plan is an updated version of the 1993 plan.

REGIONAL PROFILE

The Old Colony Planning District consists of fifteen communities located in southeastern Massachusetts. These communities consist of one city (Brockton) and fourteen towns. The greatest concentration of population and economic activity is in Brockton (1990 pop. 92,788) with 31.3 % of the total population and a comparable proportion of the region's nonresidential activity. To the southeast, Plymouth (1990 pop. 45,608) has 15.4% of the total population and comparable non-residential uses making it the second largest concentration of housing and other activities. The intervening communities are much smaller, giving the region its asymmetrically bi-nodal character.

Generally speaking, non-residential uses are in proportion to population. However an increasing amount of major retail activity is away from the center or the regional transit system (BAT). This overall trend is summarized by the fact that while the city of Brockton gained over 2,350 jobs from 1980 to 1990, its share of regional employment dropped from over 53 % to 35 % during that period. During the same period the City's share of the region's population dropped from 34.45% to 31.35%. These trends, plus the greater interaction with the rest of the Greater Boston metropolitan area, have increased travel demands.

The 1990 population of 296,864 was a 7.2% increase over the 1980 regional population. During that time the population of the City of Brockton and the town of Avon, Stoughton and Whitman, decreased by 2.5%, 9.3%, 0.3% and 2.2% respectively. The Town of Plymouth experienced the greatest growth with an increase of 27%.

The overall labor force that is 16 years and older in the Old Colony Region totaled 159,655 in 1990. Of this total 53 percent were males and 47 percent were females. Most of the area towns experienced an overall increase in employment since 1980. The exceptions to this regional trend

were: East Bridgewater, Plympton, and Whitman, which had a net loss of jobs.

While the OCPC Median Household Income increased 19.27% since 1980, the State's Median Household Income declined by 2.74%. Median Family Income increased 21.64% since 1980 while the state increased 15.21%. The OCPC Region Per Capita Income also increased 38.10% since 1980, which is considerably higher than the state level and the same level as Brockton's PMSA. Population emigration trends in the face of a sluggish employment market are indicative of the growing role of the region's communities to function as "bedroom suburbs" for the Boston and Route 128 employment centers. People moving into the area from Metropolitan Boston typically remain employed outside the region.

Over the last ten years the OCPC Region has seen a significant change in the travel patterns. Based on the US Census, 68.27 percent of commuters drove alone in 1980 and in 1990 this percentage rose to 79.27 percent. Transit share of work trips in the OCPC Region decreased from 4.58 percent in 1980 to 3.48 percent in 1990.

The OCPC journey-to-work data indicated that there were 183,911 total work trips in the region. Approximately 144,888 person work trips originated in the region and approximately 39,023 originated outside the OCPC Region.

REGIONAL GOALS

This Transportation Plan represents the MPO's effort to craft a document and a process that meet the challenges of preserving and expanding a truly intermodal transportation system. It includes the policies, goals, analyses and recommendations necessary to build and maintain an efficient, effective and affordable regional transportation system. It is the intention of the MPO to build on the current system, working to make it comprehensive and fully integrated. The goal is a balanced range of well-connected transportation options that will use the best of each travel mode: auto, transit, air, rail, truck, boat, pedestrian and bicycle. This plan identifies transportation project needs for the next twenty plus years in the OCPC Region.

To reach that goal, OCPC has incorporated the following fifteen factors required by ISTEA in the formulation of the regional transportation plan:

- preserve the existing system;
- integration of the system;
- reduce congestion;
- reduce air and noise pollution;
- improve physical accessibility;
- ensure safety;
- stimulate economic development;
- support multimodal choices;
- improve intermodal connections;
- promote public involvement in the planning process;
- increase the use of mass transit high occupancy vehicle lanes;
- develop a financially sound plan;

- preserve Rights-of-Way;
- enhance freight movement;
- incorporate energy conservation goals/objectives.

The prime objective of this Transportation Plan is to establish the framework and guidelines for decision-makers to use when selecting among projects, programs and facilities that have different and sometimes conflicting objectives. The Transportation Plan recommends studies and specific short-term and long-term project priorities that are needed to maintain the existing transportation infrastructure and produce a more balanced, safe and affordable regional transportation system. The principle way in which Transportation Plan recommendations will be translated into action is through the Transportation Improvement Program (TIP). The TIP is a multimodal list of projects for which federal surface transportation funds are used. The TIP covers a three year period and is updated every year. It must be based on a reasonable estimate of funds that will be made available to the region.

Additionally, OCPC will assist MHD in developing the following management systems to provide additional information needed to make effective decisions:

- Pavement Management System (PMS)
- Bridge Management System (BMS)
- Highway Safety Management System (SMS)
- Traffic Congestion Management System (CMS)
- Public Transportation Facilities and Equipment Management (PTMS)
- Intermodal Facilities Management System (IMS)

The purpose of these systems is to help identify needs, monitor conditions and evaluate performance. After these systems come on line, OCPC will use them as a source for decision making in the region and will specifically incorporate them in the next revision to this Plan. In addition, a Traffic Monitoring System (TMS) for highways and transportation facilities and equipment must be developed and implemented. MPOs shall be given appropriate opportunities for involvement, establishment and implementation of each management system. The level of contribution, participation and effort required of the MPOs may vary for each of the management systems.

EXISTING CONDITIONS AND PROBLEM IDENTIFICATION

The sections that follow describe the existing regional transportation system and the problems related to the system.

Bicycle Transportation

The Boston to Cape Cod Bikeway constitutes the major bike route of both the Old Colony Region and eastern Massachusetts. This multi-regional facility extends for 52 miles from the Avon/Stoughton town line to the Cape Cod Canal. Throughout the region, the Boston to Cape Cod bikeway functions as a bike route or Class III facility. The alignment traverses existing roadways with the bike route designated by signing.

Pedestrian Transportation

In terms of pedestrian facilities, there are no dedicated facilities in the OCPC Region which serve a regional transportation function. Pedestrian facilities are located in various OCPC communities within their Central Business Districts (CBDs). They are generally located on functionally classified roadways.

Goods Movement

Rail and truck operations constitute the principal freight modes in the OCPC Region. The flow of commodities generally has inter-regional and interstate destinations. The largest number of trucking terminals in the region are located in Brockton, Avon, Stoughton and West Bridgewater.

Air Transportation

Plymouth Airport is the only public airfield in the OCPC Region. The airport functions as a general aviation facility serving private operators and individuals. In recent years, the number of take-offs and landings recorded at this site has demonstrated a marked growth. This rapid expansion coincides with a national trend of increased general aviation activity.

Waterborne Transportation

The port of Plymouth serves as the center for marine transportation in the Old Colony Region. Harbor activities pertain primarily to commercial fishing and recreational boating. The port contains two landing areas: Plymouth Harbor and North Plymouth Harbor. Between 1972 and 1977, the total tonnage of waterborne freight utilizing local facilities declined significantly, but has stabilized since.

Mass Transit

Because of the region's population growth and the heavy reliance on Boston for employment, access to Boston is an important priority. Area highway and transit facilities do not meet the existing and future needs for access to Boston.

Federal approval of the federal Environmental Impact Statement for the rehabilitation of commuter rail service in the Old Colony Region constitutes one large step toward improving intermodal transportation south of Boston and reducing highway congestion. The \$480 million project will reactivate commuter rail service on both the Middleborough Line and the Plymouth Line in 1996. In terms of fixed-route bus service, extensions into outlying communities would greatly increase the usefulness of the system but are constrained by a lack of funds and of demand.

Currently, eight of fifteen communities receive DIAL-A-BAT service in the OCPC Region. DIAL-A-BAT communities which join BAT for the provision of DIAL-A-RIDE services (demand

responsive or subscription) find it to be more economical than operating the service itself through their respective Councils on Aging.

Highways

The analysis identified a total of one hundred and thirty-one (131) intersections experiencing congestion and/or safety problems and require mitigation.

The overall historic traffic growth rate for the OCPC Region has been approximately 2 percent annually. Future traffic growth will not be uniform throughout the region. It is expected that there will be wide variation from place to place. Some roads will experience major increases while others will experience little or no change.

Corridor segments with capacity problems were identified through review of the various studies undertaken since 1981. Among the worst corridor segments in terms of capacity are sections of the following state numbered routes: Rt.3, Rt.18, Rt.24, Rt.27, Rt.28, Rt.106, Rt.123, Rt.138, and Rt.139.

FUTURE CONDITIONS AND PROBLEM IDENTIFICATION

The future conditions in the OCPC area are dependent upon the implementation of this plan. Projections now consist of a combination of population growth and the infrastructure capacities. Increased population will put more strain on the highway system throughout the region, increasing the need for additional capacity and higher performance. Problems not existing now are going to manifest in the future in the form of: intersection safety problems, corridor congestion and safety, town center congestion, and the physical deterioration of the existing structures and roadways. OCPC's recommendations are geared to avoiding these problems and dealing with any that have already begun. OCPC has planned 87 long term highway projects and 52 long term bridge projects.

ENVIRONMENTAL AND OTHER ISSUES

The following environmental issues are important to the region:

Air Quality

Overall, in accordance with the provision of the 1990 Clean Air Act, OCPC has determined that the implementation of the Regional Transportation Plan satisfies the conformity criteria and is consistent with the Massachusetts State implementation Plan.

Water Quality

Protecting water resources is important for a better quality of life, economic development,

recreational activities, wildlife and plant protection, and public and private water supplies. MHD is in the process of developing a policy to address the protection of wetlands, control of stormwater runoff and the use of road salts.

RECOMMENDATIONS: PROGRAMS AND PROJECTS

Recommended programs and projects are as follows:

Highway

- Maintain and improve existing infrastructure
- OCPC advocates additional studies to address congestion problems on Route 24 and Route 3
- OCPC advocates improved east-west access in the region through the widening of Route 106 in West Bridgewater and widening of Route 123 in Brockton
- Initiate improvement strategies for enhancing traffic circulation in Downtown Brockton and town centers
- OCPC supports intermodal facilities; Pedestrian and Bikeways; Corridor Improvements and Bridge Reconstruction/Rehabilitation

Mass Transit

- OCPC supports studies considering the feasibility of establishing intercity bus service between Brockton and Taunton and Brockton and Plymouth
- OCPC supports the Old Colony Rail Rehabilitation Project
- OCPC advocates further extension of the commuter rail
- OCPC supports increased promotion of ridesharing, HOV lanes, employer sponsored trip reduction plans and use of alternative forms of energy

Paratransit Service

- OCPC endorses BAT's efforts to expand DIAL-A-BAT operations

Bicycle Transportation

- Efforts should be made to identify, designate and implement additional bicycle paths

and route

Goods Movement

- OCPC encourages the development of policies which will serve to expedite the movement of goods within and through the region in an effort to further develop the economic potential of the area

Air Transportation

- OCPC encourages the use of smaller general aviation airports in the region
- OCPC recommends a study of the potential for municipal airports to serve as freight terminals

Waterborne Transportation

- OCPC recommends the development of additional public moorings in Plymouth Harbor
- OCPC recommends that a feasibility study be conducted which studies the potential for expanding North Plymouth Harbor

This Plan addresses all modes of transportation, the demands put on them, and solutions for the problems that will be encountered. In conclusion, this Transportation Plan is designed to meet the transportation needs of the Old Colony Planning Council District for the next twenty-five years.



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PIONEER VALLEY PLANNING COMMISSION (PVPC) REGIONAL TRANSPORTATION PLAN SUMMARY

The 1993 Regional Transportation Plan (RTP) outlines the direction of transportation planning and improvements for the Pioneer Valley Region (PVR) through the year 2020. The RTP provides an up-to-date inventory of the transportation infrastructure, as well as, a comprehensive examination of transportation issues and opportunities effecting the Region. A variety of strategies are offered to meet the needs and improve the transportation system.

These strategies are put into action via planning activities such as the Transportation Improvement Program (TIP) and Unified Transportation Work Program (UWP).

REGIONAL PROFILE

The PVR is located in the mid-western section of Massachusetts covering 1,178 square miles, roughly the size of the state of Rhode Island. The PVR is the second largest metropolitan area in Massachusetts encompassing 43 communities from Hampden and Hampshire counties and over 600,000 residents. The region is located at the interchange of the Massachusetts Turnpike (East-West) and Interstate 91 (North-South), known as the "crossroads of New England," offering easy access to all markets in the Eastern United States and Canada. Springfield, the third largest city in Massachusetts, is the Region's cultural and economic center, and is home to the Region's twenty largest employers. The cities of Holyoke and Chicopee were the first planned industrial communities in the nation. Many of the historic structures in these cities are still maintained, although, most mills and industries are now gone. This is due to the PVR shifting from a primarily manufacturing to a service base economy. The PVR is also home to many rural communities along the foothills of the Berkshires and eastern portion of the Region.

A wealth of economic, historical and environmental attractions are located throughout the PVR. The Milton Bradley Company, Basketball Hall of Fame, University of Massachusetts Amherst Campus and the Connecticut River are just a few unique features that make this Region an exceptional place to work and live.

REGIONAL GOALS

The following statement expresses the overall goal of the RTP: *"The Pioneer Valley should strive to attain a safe and dependable transportation system for the efficient movement of people and*

goods within and throughout the region that is: multimodal, coordinated, energy efficient, environmentally sound and cost effective."

The RTP contains objectives that have been developed to set the course of action to meet and maintain this goal. The following is a sampling of the Region's transportation system objectives:

- Development of multimodal passenger transportation facilities in the Region's urban areas which connect with and service commercial, industrial and high density residential centers.
- Development of a regionwide system of non-motorized trails and facilities to supplement motorized sources.
- Development of a rural roadway system with it's primary emphasis on providing access for rural residents to rural town centers, regional transit service and the Region's urban areas.
- Minimize the amount of energy consumed per unit of people or goods moved in the Region. Average vehicle miles traveled and average daily traffic reductions can be realized by increased people and/or goods being carried per vehicle.
- Application of management systems to address deficiencies in a strategic approach. Life cycle cost analysis and financial constraint components of the decision making process should be developed and applied systematically.

EXISTING CONDITIONS AND PROBLEM IDENTIFICATION

The PVR contains 4,283 miles of roadway that is functionally classified according to the service they are intended to provide. The following is a summary of the percentage of roadway by functional classification in the PVR.

<u>Functional Classification</u>	<u>Miles</u>	<u>Percent of Total Road Miles</u>
Interstates	87.1	2.0%
Principal Arterials	65.9	1.5%
Minor Arterials	232.9	5.5%
Other Principal Arterials	73.7	1.7%
Major Collectors	628.1	14.7%
Minor Collectors	409.8	9.6%
Local Roads	2785.6	65.0%
Total	4283.1	100.0%

Presently there are no plans to significantly expand the Region's infrastructure. Priority is directed to maintaining and improving the present infrastructure. Maintenance responsibilities for these roadways is as follows, 77.4% by communities, 11.7 % by private organizations, 6.9% by the Massachusetts Highway Department (MHD) and 4% by other organizations.

The PVR contains 677 bridges which have been rated according to the American Association of State Highway and Transportation Officials (AASHTO) bridge rating system. Of the Region's bridges, 53% are non-deficient, 33% are functionally obsolete and 14% are structurally deficient. At the present time, the bridges rated as structurally deficient are a focal point of the Region's concern.

The Pioneer Valley Transit Authority (PVTA) is the leader in providing local transit service in the Region. Currently, PVTA offers service to 21 communities in Hampden and Hampshire counties. The PVTA operates a fleet of 175 fixed route buses and had a regional total ridership of 11,150,782 in 1992. In addition to PVTA there is a variety of private carriers providing service within and out of the Region. These buslines are: Bonanza, Greyhound, Peter Pan and Vermont Transit.

The PVR is well serviced by air transportation facilities within and adjacent to Region. These airports include the Agawam-Springfield Seaplane Harbor, Barnes Municipal, Bradley International, Metropolitan, Northampton and Westover Airforce Base.

There is one major passenger and five freight rail carriers within the PVR. Passenger service is provided by Amtrak with it's station located in downtown Springfield. The five major freight rail carriers providing service in the Region are Conrail, Guilford Transportation Industries, Central Vermont Railways Inc., Pioneer Valley Railroad and Massachusetts Central Railroad.

Non-motorized transportation has recently become an increasingly attractive mode of interest with the recent opening of the 8.5 mile long Norwottuck Rail Trail. Currently the PVR has 14.5 miles of bikeway facilities with a vast array of new proposals to expand the network.

FUTURE CONDITIONS AND PROBLEM IDENTIFICATION

The RTP addresses the Regions needs and concerns through the year 2020 and is divided into two components, the Short Range Element (SRE) and the Long Range Element (LRE). The SRE provides an outline of the transportation needs of the PVR over the first five years of the plan. The SRE provides a prioritized project listing that is financially constrained and provides the basis for the PVR Transportation Improvement Program (TIP). The LRE extends beyond the SRE to the year 2020. A long range financial plan is included in this section that contains estimated future apportionments for the PVR. Based on historical data it is estimated that the PVR will implement over 900 million dollars in project funds over the period of 1998 - 2020. This information is used to establish financially constrained priorities for future improvement of the transportation infrastructure in the PVR.

Major short range projects include:

- Reconstruction of Route 57 in Agawam
- Rehabilitation of the South End Bridge in Agawam and Springfield
- Bus Replacements
- Reconstruction of Shwinigan Drive in Chicopee and Ludlow
- Rehabilitation and widening of the Calvin Coolidge Bridge and Route 9 in Hadley and Northampton
- Reconstruction of Route 66 from Huntington to Northampton
- Improvements to the Town Common Area in South Hadley
- Reconstruction of Boston Road (Route 20) in Springfield
- Reconstruction of Route 21 in Springfield
- Reconstruction of Route 5 in West Springfield and Holyoke

By the year 2020 it is expected there will be a number of roadway capacity deficiencies throughout the PVR. The following is a sampling of these areas of potential deficiencies:

<u>Community</u>	<u>Roadway Section</u>
Amherst	Route 116 from Sunderland Road to the Sunderland Town Line.
Chicopee	Interstate 91 from the Springfield city line to Interstate 391.
Palmer	Route 32 from Route 20 to Thorndike Street.
Southwick	Route 57 from the Agawam town line to Powder Mill Road.
Westfield	Route 10/202 from Pochassic Street to Meadow Street.
West Springfield	Route 20 from Elm Street to the North End Bridge Rotary.

ENVIRONMENTAL AND OTHER ISSUES

The RTP addresses numerous issues impacting the transportation system throughout the PVR. Include are issues related to Environmental Impacts, Transit, Transportation of Goods, Management Systems and Design Standards. The following is a sampling of the issues addressed by the RTP.

- The CAAA of 1990 require that all designated areas that failed to meet the National Air Quality Standards (NAAQS) for Ozone and Carbon Monoxide (CO) to develop a plan that will reduce 1990 emission levels 15% by the year 1996. The entire PVR is classified non-attainment for ozone, while the city of Springfield is the only non-attainment area for CO in the PVR. To achieve the Ozone and CO reduction target,

strategies to be considered include: enhanced inspection and maintenance of vehicles, trip reduction and traffic control measures. Enhanced inspection and maintenance would require vehicles to be tested for emissions more thoroughly and to a greater degree than at the present. Enforcement of the Massachusetts law requiring employers of 250 or more to institute trip reduction strategies will be explored. Also, improvement to existing traffic operations will be addressed as traffic control measures to improve air quality.

- The Americans with Disabilities Act (ADA) of 1990 addressed specific actions to be taken by transit providers. These actions includes all newly purchased or leased vehicles used in fixed route service must be accessible, making remanufactured vehicles more accessible to the maximum extent feasible and paratransit service must be provided to disabled individuals unable to use the fixed route system. The PVR will oversee that these requirements are adhered to by all transit providers and Amtrak passenger service.
- Trucking remains the primary mode of transportation for the movement of goods in the PVR. The regions railroads have not reached their full potential within the PVR at the present time for a number of reasons including: an image of railroads as a slow, inefficient and non-competitive mode for the movement of goods and the lack of strong commitment by Federal, State and Local officials to promote rail use and/or increase funding. The PVR will strive to overcome this misconception and rejuvenate rail as an efficient and competitive mode of travel and transportation of goods.
- There is a continuing need for a systematic approach to prioritizing and implementing infrastructure improvements throughout the State and PVR. In cooperation with the State, the PVR will incorporate regionwide management systems as regulated under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) in development of an effective and efficient improvement strategy for all of the regions travel modes. These management systems will include Bridge, Congestion, Intermodal, Pavement, Public Transportation and Safety.
- The Federal Highway Administration (FHWA) and Massachusetts Highway Department (MHD) adopted roadway designs that suit the capacity and safety needs of each roadway functional class. The design standards need to be revisited so that all areas are considered, including rural communities. Presently, the design standards for many arterials passing through rural areas require excessive travel widths and shoulders. For these communities to exercise their right to the application of federal highway funds, extensive widening and destruction of scenic character may be necessary. The highway design standards should be changed to specifically account for this neglect of rural community opportunity and do so without the sacrifice of safety.

RECOMMENDATIONS: PROGRAMS AND PROJECTS

The LRE has set forth a set of priorities of improvement activity for the PVR addressing the areas of Safety, Congestion Relief, Preservation, Enhanced Mobility and Environmental Improvement. The following is a sampling of these priorities.

- The highest priority within the PVR related to safety is the rehabilitation of the bridge system. There are 94 bridges (14%) in the Region that are rated as structurally deficient. The plan of action for the PVR is to address the deficiencies in a timely manner before conditions deteriorate to unsafe and/or irreparable conditions. Also, intersections within the PVR listed on the states top 1,000 high accident locations will be examined followed by proposed improvements to eliminate hazardous conditions.
- Areas of congestion will be identified through the conduct of regional corridor studies and local input. An established set of performance measures will be evaluated to indicate the level of severity of each area. Priority will be given to the relief of those corridors that are designated as congested.
- The preservation of the Region's infrastructure is of major concern to the PVR. The PVR will expand upon its Pavement Management System (PMS) to provide effective strategies for providing and maintaining its roadway surfaces. Projects will need to undergo PMS analysis and be prioritized to be considered for federal funding. A Bridge Management System (BMS) will also be employed to address the deteriorating bridge infrastructure through the region and state.
- Increasing the movement of people by means other than a motorized source that relieves traffic congestion, promotes intermodal usage and has environmental benefits is of great importance to the PVR. A Long Range Non-Motorized Plan will be developed for the PVR to create and maintain a network of non-motorized transportation facilities throughout the region. This will encompass all non-motorized modes of travel from walking to canoeing and incorporate intermodal connections such as Bikes On Transit (BOT).
- The Clean Air Act Amendments of 1990 (CAAA) and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) promote strategies to achieve reductions in vehicle use and lower pollution emitted by vehicles. The RTP addresses methods such as travel demand management, traffic control measures and alternate modes to reduce vehicle trips and vehicle miles traveled, therefore decreasing the amount of automobile emissions. Also, attention will be paid to approaching the air quality problem through land use development strategies.

The Regional Transportation Plan explores all aspects of the transportation system, identifies deficiencies and sets priorities. The Short and Long Range Elements of the RTP, together, establish the direction of transportation improvements over the next thirty years and the mechanisms that may be used to remedy them and improve the transportation system. As a start, deficiencies identified under the long range forecast will be the focus of applying these priority improvement actions. Consequently, the PVR will continue to implement sound strategies striving towards a transportation

system that is intermodal, cooperative, energy efficient, environmentally sound and cost effective in accordance with the overall goal of the RTP.



Acushnet
Attleboro
Berkley
Carver
Dartmouth
Dighton
Falmouth
Fall River
Freelown
Lakeville
Mansfield
Marion
Mattapoisett
Middleborough
New Bedford
North Attleborough
Norfolk
Plymouth
Raynham
Rehoboth
Rochester
Seekonk
Somerset
Swansea
Taunton
Wareham
Westport

SOUTHEASTERN REGIONAL PLANNING AND ECONOMIC DEVELOPMENT DISTRICT (SRPEDD) REGIONAL TRANSPORTATION PLAN SUMMARY

The Southeastern Regional Planning and Economic Development District (SRPEDD) serves 27 cities and towns in southeastern Massachusetts. SRPEDD's primary responsibility is to provide comprehensive planning services for its member communities, including transportation planning.

Agencies in the region involved most directly in transportation planning include: the Joint Transportation Planning Group (JTPG), the Greater Attleboro-Taunton Regional Transit Authority (GATRA), and the Southeastern Regional Transit Authority (SRTA).

REGIONAL PROFILE

The industrial mix of Southeastern Massachusetts (agriculture, fishing, manufacturing, and high technology) is representative of the prevalent industrial mix throughout the state.

Unemployment in the region's two largest cities, New Bedford and Fall River, reached 13% in 1992 and has shown little or no improvement in 1993. As a result of this urban decline, growth in the region is expected to be slow over the next fifteen years. A key period for the region will be between 2005 and 2010, when substantial job growth is forecast for the region, primarily in the towns. The major factor behind this expected growth is the region's superior highway network. Additional catalysts to growth are the re-activation of the Old Colony commuter rail line to Boston, the expansion of the New Bedford Regional Airport, and further development of tourist attractions.

REGIONAL GOALS

SRPEDD's Transportation Plan (T-Plan) proposes to: 1) effectively address the area's current and future travel needs from both a transportation management and a growth management perspective, and 2) develop and maintain an effective, accessible transportation system which operates in a safe, economical, efficient and environmentally sound manner while also providing a range of modal choices for people and freight.

EXISTING CONDITIONS AND PROBLEM IDENTIFICATION

The sections that follow describe the existing regional transportation system and the problems related to the system.

Traffic Congestion/Safety

Concentrated commercial development has become the primary cause for traffic congestion in the region, affecting several major corridors, such as Routes 1, 6 and 44. Safety and congestion problems, combined with a lack of full access at some locations, currently exist at interchanges along Routes 24, 140 and Interstates 95, 195 and 495. Traffic congestion in the region is primarily confined to the peak periods, especially the PM peak hour. There are 43 identified safety and congestion problems that the T-Plan recommends action on. Nearly 10% of the statewide top 1,000 high-accident intersections are located in the SRPEDD region. Of the region's functionally classified road network (above local roads), 265 miles or 22% exceed the statewide average accident rate.

Bridges

The three movable bridges in the region are in poor condition, requiring major rehabilitation or replacement. Replacements are planned for the Brightman Street Bridge and the Berkley-Dighton Bridge. Major rehabilitation is planned for the New Bedford-Fairhaven Route 6 Bridge.

Airports

The SRPEDD region lacks facilities to accommodate air freight service that might benefit local economies. Although demand for this service has not yet been identified, feasibility studies are underway by the Massachusetts Aeronautics Commission to determine if New Bedford Regional Airport warrants expansion to serve regional cargo needs.

Pavement Management

The SRPEDD Road Surface Management System estimates that 67% of all pavement surveyed is in Good condition and 33% in Fair-to-Poor condition. Of the roads that are part of the Federal Aid system, approximately 74% of those roads surveyed were Good, while 26% were Poor.

Demand-Responsive Transit

Demand for paratransit service in the primarily urban Southeastern Regional Transit Authority (SRTA) area increased 113% over the last five years, with paratransit demand representing 2% of all SRTA transit trips in FY92. In the mostly rural Greater Attleboro-Taunton Regional Transit Authority (GATRA) area, paratransit demand increased 35% over the same five year period, representing 27% of all GATRA trips.

Fixed Route, Intercity and Commuter Bus

SRTA's annual fixed route ridership is about 2.5 million passengers boarded each year; GATRA's is approximately 500,000 per year.

Funding constraints continue to limit the operations of the RTAs. The annual federal subsidy for operations has been "capped" for several years and federal funds for operating costs are expected to be further reduced in the future. Available funds are not sufficient for the replacement and maintenance of buses.

Commuter express buses carry about 47% of all work trips (about 2,700 persons) from Taunton, Fall River and New Bedford to downtown Boston.

Rail

The three MBTA commuter rail stations in the SRPEDD region are in Mansfield, Attleboro Center, and South Attleboro. There is a need for more parking space at South Attleboro and Mansfield. The waiting room at the Mansfield station is too limited, and South Attleboro does not have any enclosed waiting area. Fixed route bus connections from RIPTA or GATRA are non-existent at the South Attleboro station and GATRA has no connections from the Mansfield station.

FUTURE CONDITIONS AND PROBLEM IDENTIFICATION

Road Network

A slow increase in population, housing and employment in the region is projected over the next 30 years. Traffic conditions due to Vehicle Miles Travelled (VMT) growth after the turn of the century will place a burden on some of the principal arterial roads in the region, particularly Interstate 95, Route 24, and Route 44; plus many of the lesser arterial and collector roads, such as Routes 152 and 123 in Attleboro, and Route 6 in Dartmouth.

Demand-Responsive Transit

Substantial increases in elderly and mobility-limited populations will continue to characterize the demand for paratransit services throughout the region. However, local and state budgetary constraints hamper the expansion of this service in rural areas and concentrate paratransit investments in urban areas where the Americans with Disabilities Act (ADA) makes the service mandatory. This trend raises concern over how to address the future mobility needs of persons who are not ADA-eligible but are elderly and/or mobility-limited. Both RTAs will need additional sources of revenue if they are to maintain the present level of service.

Fixed Route, Intercity and Commuter Bus

Population, employment, and businesses shifts from urban to suburban locations make fixed route bus service increasingly expensive. As single family home populations increase and urban populations decrease, trip patterns will continue to be scattered in rural areas that cannot reasonably be served by fixed route or intercity transit.

The demand for fixed route service between Massachusetts and Rhode Island will greatly increase in the future as the economy of the greater Providence area rebounds.

Rail

The MBTA's Old Colony commuter rail line to Lakeville (to begin operation in 1996) will attract commuters from locations along I-495. This should partly satisfy the increased demand for transit between the SRPEDD region and Boston during the construction of the depression of the central artery. MBTA commuter rail service will be extended to Taunton, New Bedford and Fall River sometime between 2005 and 2010.

ENVIRONMENTAL AND OTHER ISSUES

Eastern Massachusetts has been designated as an ozone non-attainment area that is classified by the Environmental Protection Agency (EPA) as "Serious." To evaluate the impact of the T-Plan on the State Implementation Plan (SIP) for air quality, SRPEDD has conducted an air quality analysis, per EPA guidance. The results of this analysis demonstrated that:

1) T-Plan projections will result in reduction of ozone precursor emissions when comparing Action (Build) with Baseline (No Build) scenarios for the Clean Air Act Amendment year 1999; 2) volatile organic compound (VOC) emissions from this 1999 Action scenario are less than the region's VOC budget; and 3) oxides of nitrogen (NOx) emissions from the same Action scenario for all years are less than the EPA's NOx guideline value.

Park and Ride Lots

At present, none of the lots in the region are at capacity, but if carpooling returns to previous levels, new Park and Ride locations will be needed. To encourage use of Park and Ride lots, the T-Plan recommends new lots be created along I-95, I-195 and I-495, where easy accessibility makes these superior locations.

Ferry Service to Islands

There may be opportunities to establish New Bedford as an alternate port for ferry service to Martha's Vineyard, in addition to current seasonal passenger service.

Bicycle and Pedestrian

The T-Plan concludes that existing roadways are too narrow to safely accommodate bicyclists and recommends the development of bicycle paths.

Pedestrian accessibility to transit, central business districts and shopping facilities should also be incorporated into future roadway projects and developments.

RECOMMENDATIONS: PROGRAMS AND PROJECTS

The creation of more intercity bus routes in the SRPEDD region would provide a benefit to the subregional economic structure. It is essential that Rhode Island and Massachusetts actively cooperate in extending their bus service to each other's populations and shopping areas. SRPEDD recommends extending MBTA commuter rail service from Boston to the major metropolitan areas of Taunton, Fall River and New Bedford.

A major investment is called for in providing SRTA with new or vastly improved maintenance facilities within the next five years.

Route 24 and I-95 require special attention over the next 20 years to upgrade interchanges and accommodate expected traffic growth. The development of an extended High Occupancy Vehicle Lane system needs to be studied for both routes, all the way into Boston.

It is anticipated that the \$70+ million relocation project of the Route 44 corridor from Carver to Plymouth will continue to be a catalyst for an increase in and stability of regional employment, as well as the solution to numerous safety and congestion problems.

Accessing the Future

Part Two: Foundations for Planning

- Chapter 5: The Massachusetts Transportation System
- Chapter 6: Regulatory Framework for Transportation
- Chapter 7: The Planning Process in Massachusetts
- Chapter 8: Public Participation in Planning

CHAPTER 5

THE MASSACHUSETTS TRANSPORTATION SYSTEM

The Commonwealth of Massachusetts has an extensive intermodal transportation system. Its highways are among the safest in the country. Transit usage in general is above the national average. Intercity rail and bus service provide frequent service to points south and west of the state. Its ports and international airport, which is the 10th busiest in the country, serve all of New England and act as gateways to the world.

In order to improve and expand this transportation system to adequately serve future demands, we must have a good understanding of current demands and travel conditions. This chapter discusses trends in transportation supply and demand in the Commonwealth. The first section identifies the users of the various transportation facilities and discusses how their needs are influenced by and affect the facilities. The second section describes the various facilities; and the third describes how these facilities are used by the citizenry. The last two sections discuss various transportation initiatives and expected future trends. Modes are discussed independently. However, they work together as parts of an ever-evolving intermodal system.

PROFILE OF TRANSPORTATION SYSTEM USERS

The total population in Massachusetts has not increased a great deal over the past twenty years. The number of households, however, has increased at a much faster pace. Many of these households along with an increasing number of jobs (employment has increased by almost 50%) have settled in suburban locations or in less densely populated areas that are either served poorly or are not served at all by public transportation. These trends along with their impacts on the transportation system are discussed in this section.

Population and Households

According to the 1990 Census, Massachusetts has a population of over 6 million people. Total population has remained stable during the past twenty years increasing by only 6% between 1970 and 1990 with 85% of the growth occurring between 1980 and 1990. Part of the 1980-1990 increase is attributable to the in-migration of workers during the "boom" period in the early to mid eighties.

Naturally, the rate of population change is not distributed uniformly across the state. Many individual communities have experienced a tremendous amount of growth, while others have remained stable or even experienced a decrease in population. High growth communities tended to be in more sparsely populated areas that have lower housing costs. Communities with stable or declining populations tend to be very densely populated and have little buildable land or tend to be in areas with decreasing employment opportunities.

Population distribution has major impacts on the transportation system. Older communities with stable or declining populations tend to have higher concentrations of public transportation, while high

growth communities usually do not have the population or employment densities necessary to support public transportation. Therefore the predominate mode of travel in high growth communities tends to be the private automobile.

Figures 5-1 and 5-2 show absolute and percentage population change respectively between 1970 and 1990 by community. The state's central cities (i.e., Boston, Pittsfield, Springfield, Worcester, Fall River) and the communities that surround them have experienced decreases in population, while communities on the fringes of the older suburbs have grown.

The communities experiencing the largest increase in population are located south of Boston, particularly in Plymouth County and on Cape Cod. The Cape's population almost doubled (+93% or 89,900 people) between 1970 and 1990 while Plymouth county's population increased by 30% (102,000 people). (The rate of change slowed considerably between 1980 and 1990). Only three of the forty-two communities in Plymouth county and the Cape experienced small population losses in the twenty year period. Public transportation in most of these communities is quite limited necessitating heavy reliance on the auto for personal travel. In addition, people who commute to jobs in communities to the north, particularly Quincy and Boston, have fairly limited highway options. The Old Colony Railroad Rehabilitation Project which will restore commuter rail service to some communities in Plymouth County will provide a commuting alternative.

Following national trends, the number of households (a social unit composed of one or more persons who live in the same dwelling) in the state has increased at a much faster rate than the population in general. Even communities that have lost people have gained households. This increase is due in part to the decrease in household size (i.e., more people living alone). Household size decreased from 3.09 in 1970 to 2.58 in 1990. However, the rate of down-sizing has begun to slow. The average household size decreased by 12% from 1970 to 1980, but decreased by only 5% between 1980 and 1990. There were 27% more households in the state in 1990 than there were in 1970. More households mean more person trips because certain trips are required to sustain any given household.

Vehicle Ownership

Personal mobility largely depends upon access to an auto. According to the 1990 Census, 49% of all Massachusetts households own two or more vehicles; 36% own one vehicle; and 14% do not own any vehicles. The proportion of autoless households has decreased by 13% since 1980 but is still above the national average of 11%. In some Massachusetts communities, the availability of public transportation coupled with population density lessens the need to have access to a private vehicle. For example, 38% of Boston households do not own a vehicle, whereas, only 1% of households in Truro, Boxford, and Southampton do not. All of the latter have small populations and no public transportation.

Figure 5-3 shows vehicle ownership per household by community. On average, Massachusetts households own 1.5 vehicles. The city of Boston has the lowest number of vehicles per household (0.87 per household); Dunstable has the highest (2.45 per household). Note that even in Boston, the average number of vehicles by household increased by 16% between 1980 and 1990.

Figure 5-1
Change in Population by Town 1970 - 1990

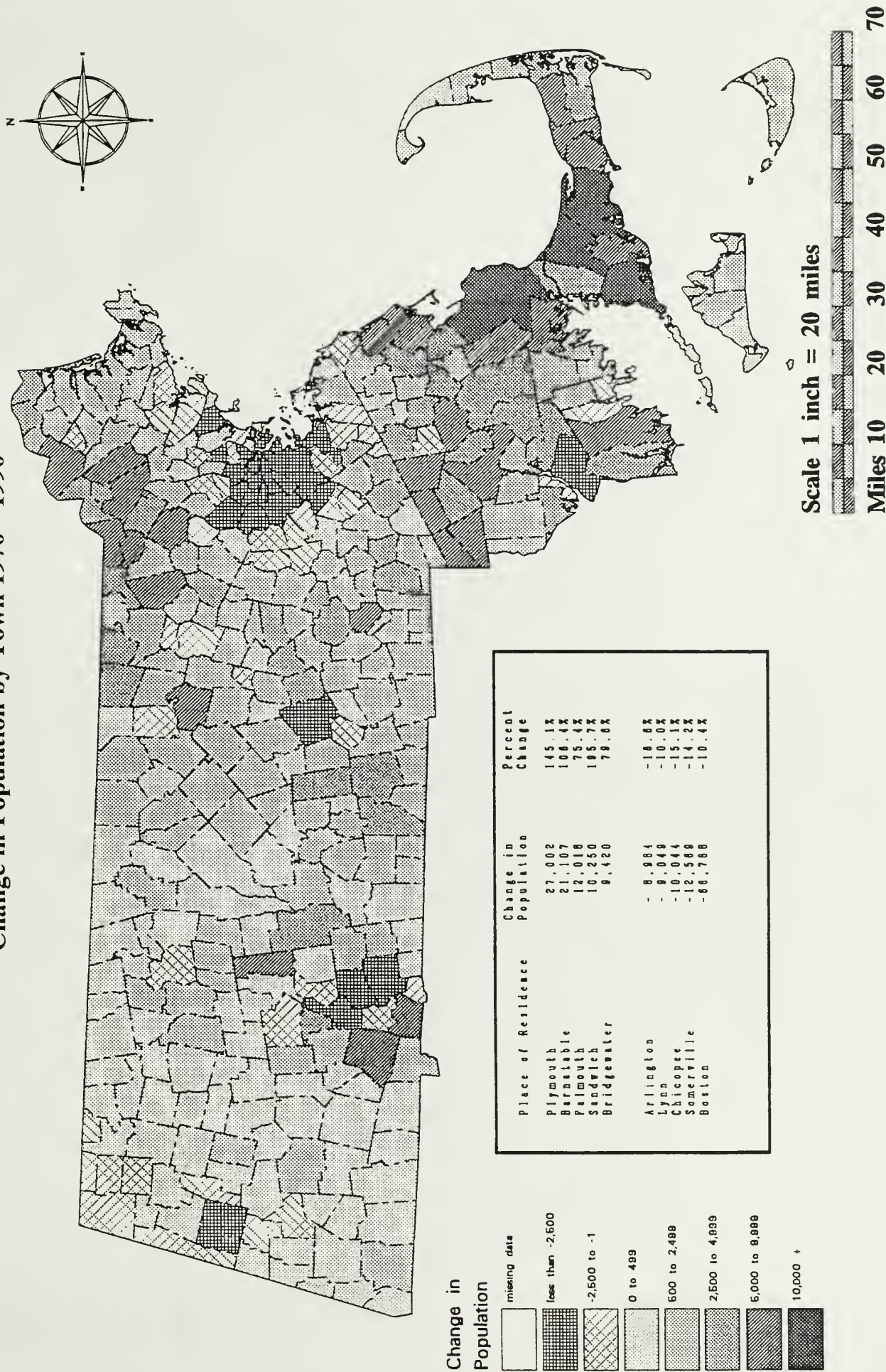


Figure 5-2
Percent Change in Population by Town 1970 - 1990

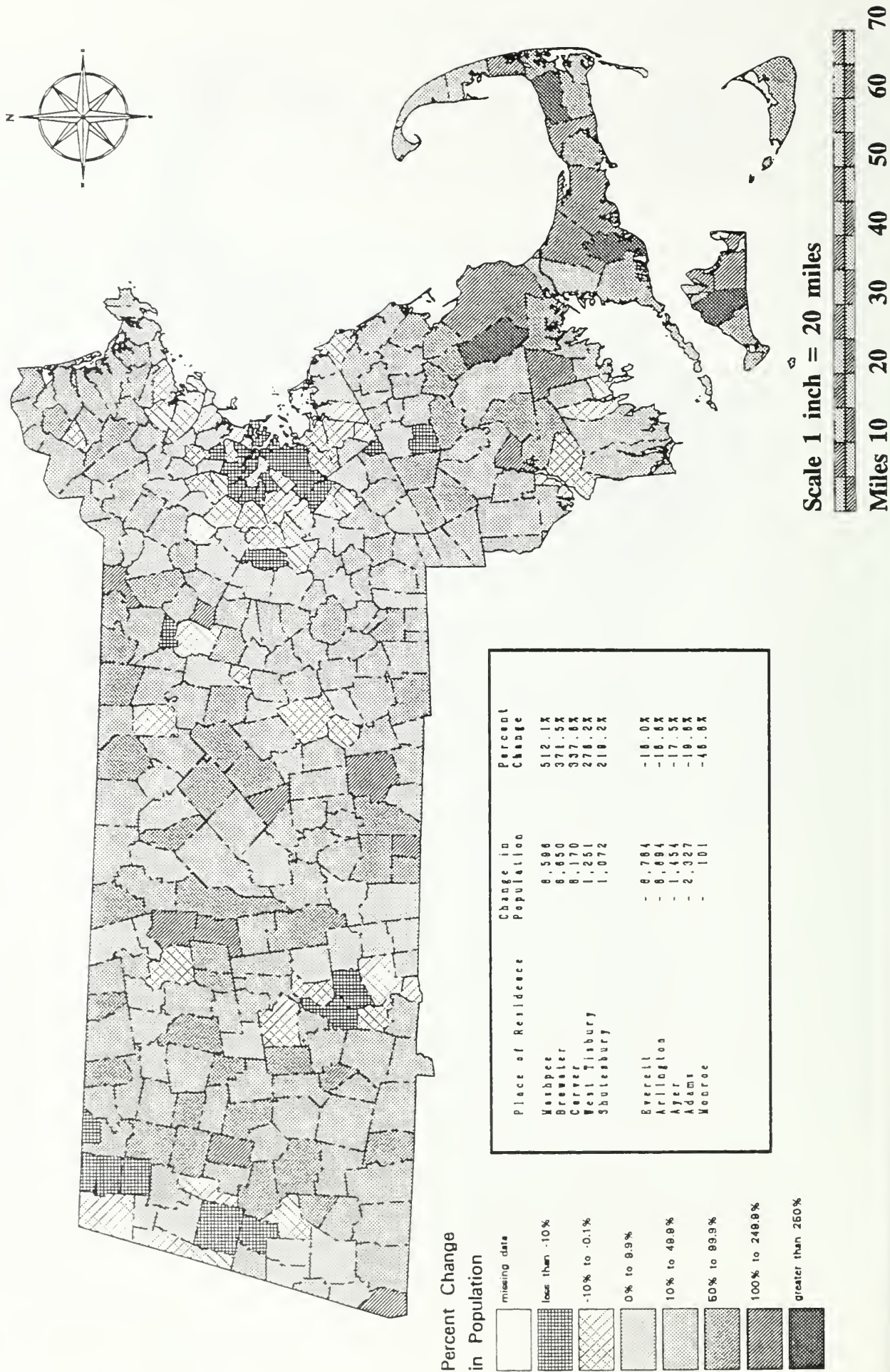
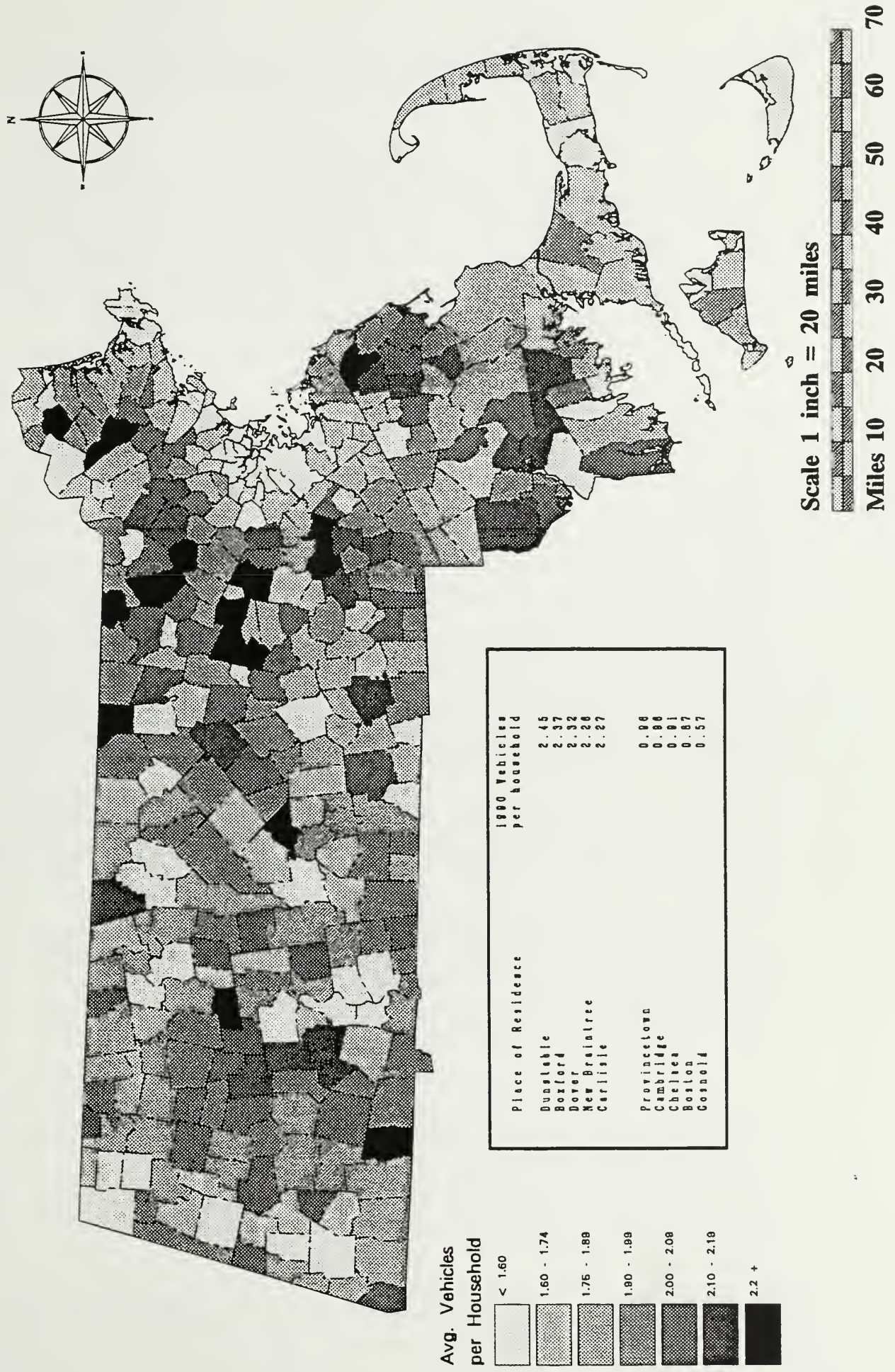


Figure 5-3
Vehicles per Household in 1990



Household Income

According to the latest U. S. Census, the average household income is \$42,600 (1989 dollars). This represents a 14% increase over the average 1980 average household income of \$37,200 (1989 dollars). **Figures 5-4 and 5-5** show average household income by community and the percentage change in real income by community over a ten year period. **Figure 5-4** shows that there are pockets of communities (mostly suburbs west and south of Boston) with high average household incomes (in excess of \$75,000) as well as pockets (mostly in the northwestern part of the state) with average incomes of less than \$35,000. Increases in real income are not distributed evenly among communities with percentage changes ranging from zero to 50% or more.

Employment

According to the 1990 U.S. Census, there are more than 3 million jobs (an increase of 46% since 1970) in the state. Nearly half of all of these jobs are located in the 25 largest cities and towns representing all parts of the state. While the mix of employment by type differs from community to community, service related jobs predominate in almost all communities. **Figure 5-6** presents the primary industrial classification (general major groupings) of jobs by community. It clearly shows that the Commonwealth's economy is essentially service-based with 44% of all workers holding jobs in the service industry. Service industries are not as centralized as other industries (i.e., they are located in cities, suburbs as well as in rural areas) and they tend to draw employees from a more widespread physical area. These two factors along with the dispersion of the population into more distant suburbs contribute to longer work trips, diminish workers' ability to use public transportation and increase dependence on the auto. Many work trips are now made from one suburb to another. This type of inter-suburban trip usually is not easily served by mass transportation which is generally designed to facilitate the commute into the urban core.

Figure 5-7 shows the proportion of jobs by the five primary industrial classifications. As was mentioned previously, 44% of all jobs are service related. Another twenty percent are in wholesale and retail trade. Eighteen (18) percent are manufacturing jobs and only one percent are related to agriculture.

Most communities, including the majority of those that lost population, experienced job growth during the twenty-year period between 1970 and 1990. Communities with absolute increases of more than ten thousand jobs are located throughout most of the state and include Boston, Amherst, Springfield and Worcester, and Brockton. Lynn, Lawrence, and Chicopee, all of which are central cities, had the largest absolute losses in employment 5,800, 3,500, and 3,400 jobs respectively).

Another aspect of employment that has implications for the transportation system is the increase in the number of households where both spouses work. Choosing the community in which to live becomes more difficult when the convenience to two jobs has to be considered. It is likely that at least one spouse will have to make a longer work trip than he or she might otherwise have. Also because of the location of jobs or the need to drop off children at school or daycare, carpooling with a spouse might not be an option. The absolute number of two-earner households in Massachusetts increased by 54% between the 1970 and 1990 Censuses. Currently, both spouses work in 63% of married couple families.

Reverse?

Figure 5-4
Mean 1989 Household Income by Town

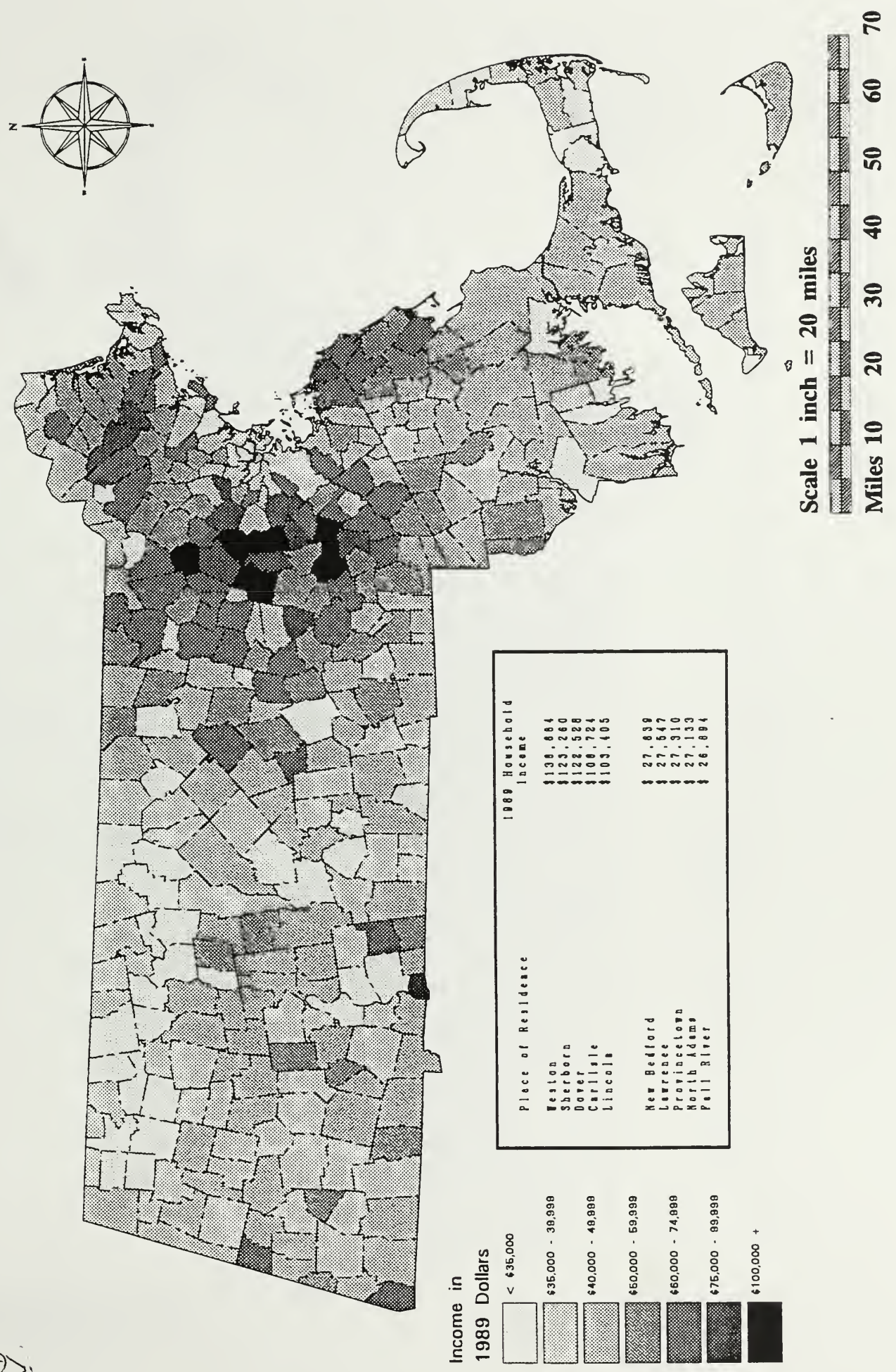


Figure 5-5
1979-89 Household Income Growth by Town (Percentage Change in Real Income)

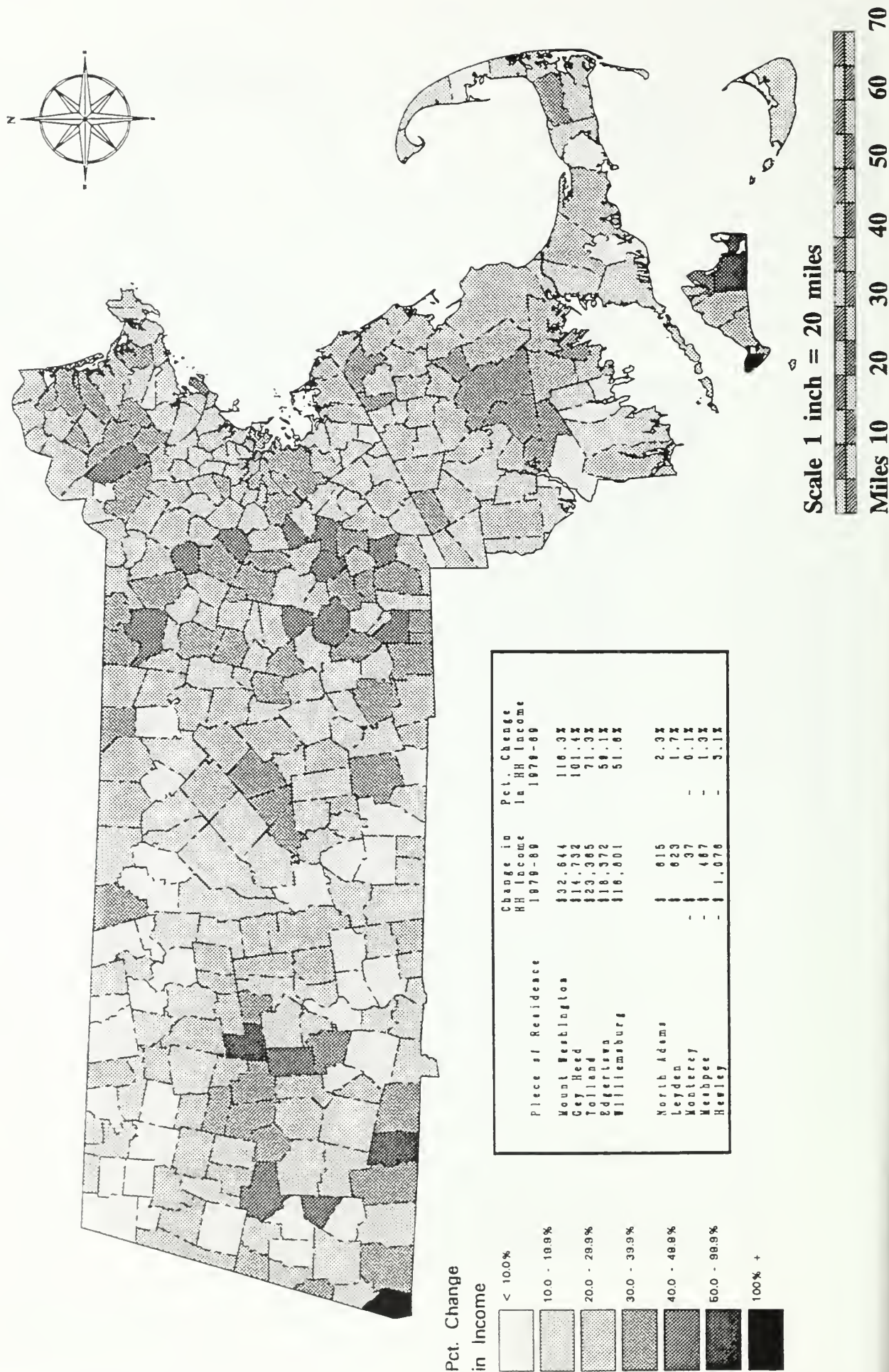


Figure 5-6
1990 Census Employment Statistics (Primary Industrial Classification by Town)

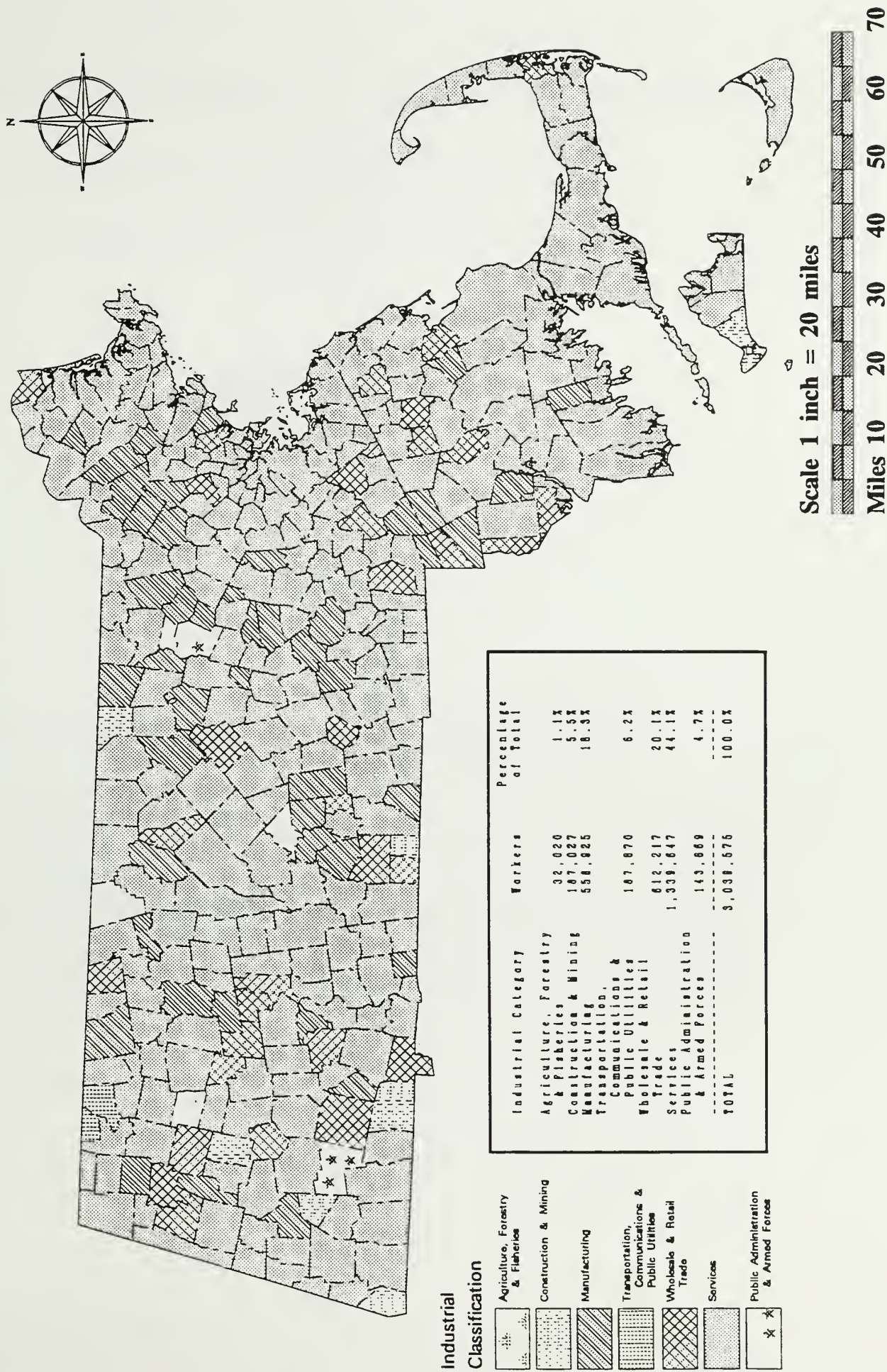
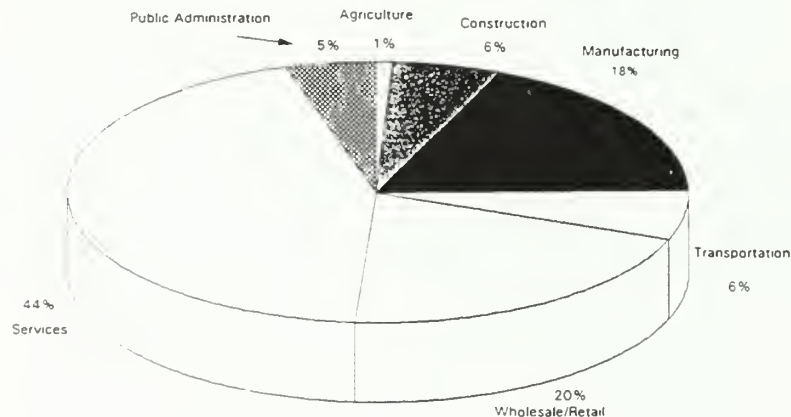


Figure 5-7
Employment by Primary Industrial Classification



Agriculture includes forestry and fisheries.

Construction includes mining.

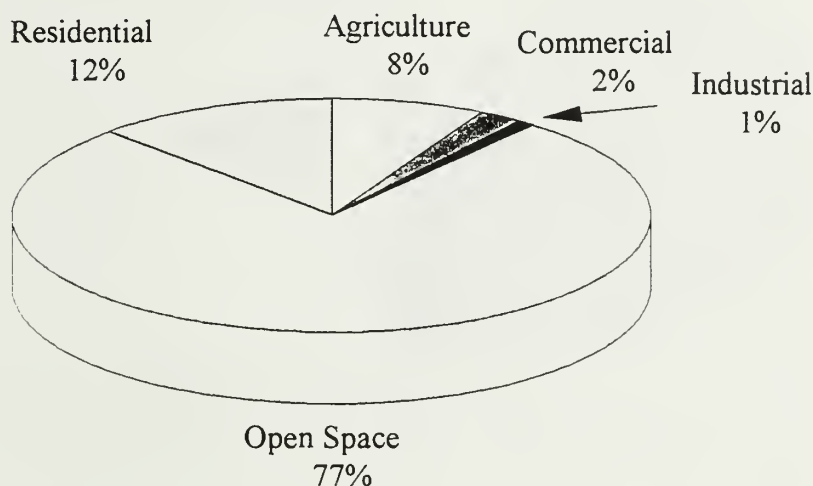
Transportation includes communications and public utilities.

Public administration includes armed forces.

Land Use

Even though Massachusetts is an urban state with high population densities in many areas, approximately 74% of the land acreage is classified as open space (this includes parks, wetlands, and otherwise undeveloped land). Another 15% is residential, while only 7% of total acreage is used for agricultural purposes. (See **Figure 5-8** for a graphic presentation of the proportional distribution of land use.) The amount of land devoted to residential, industrial and commercial uses increased by 19% , 28% and 15% respectively between 1971 and 1985 (the latest year for which data are available). Meanwhile, during this period, the amount of land used for agricultural purposes and for open space each decreased by 4%. Of course the areas that experienced large population increases also experienced fairly large percentage increases in the amount of land used for residential purposes. For example, the acreage used for residences in Plymouth County increased by 22% with a range of 10% to 200% for the individual communities. Whereas, the amount of land devoted to residential purposes in Suffolk County (Boston, Chelsea, Revere, and Winthrop) did not change significantly. This again helps to show the dispersal of the population into areas that are beyond the reach of public transportation.

Figure 5-8
Proportion of Massachusetts Land by
Type of Use



THE MASSACHUSETTS TRANSPORTATION SYSTEM

The individual components of the transportation system are discussed separately in this section. Neither component, however, exists in isolation as they are all interconnected. For example, the Massachusetts Highway Department (MHD), the Massachusetts Bay Transportation Authority (MBTA), the Massachusetts Turnpike Authority (MTA), the Massachusetts Port Authority (Massport), and several regional municipal and private operators provide 155 park-and-ride facilities with over 39,000 spaces statewide for those who use commuter rail, rapid transit, buses, boats, and carpools. The MBTA also provides over 1,000 bicycle parking spaces at rapid transit and commuter rail stations. People can travel to Boston's Logan International by rapid transit and by boat as well as by bus and auto. And, easy access to rapid transit is provided at several key commuter rail and Amtrak stations.

The Highway System

In 1992, 3.66 million vehicles were registered in the Commonwealth. The distribution of vehicles by type was:

Automobiles	86.1%
Trucks	13.6%
Buses	0.3%

During that year, these vehicles traveled approximately 47,348 billion miles (vehicle miles traveled or VMT) on a highway system consisting of 34,323 miles of roadway (measured on the center line). A more complete measure of roadway inventory is lane mileage, since many roads have multiple lanes in each direction. The following table and pie charts show mileage by roadway type:

Roadway Type	Centerline Miles	Percent of Total	Lane Miles	Percent of Total
Local	21,524	62.7%	43,048	59.6%
Collector	6,684	19.5	13,253	18.3
Arterial	5,274	15.4	11,682	16.2
Interstate	567	1.6	3,162	4.4
Other expressway	274	0.8	1,116	1.5
Total	34,323	100.0%	72,261	100.0%

As **Figure 5-9** shows, local and collector roads make up more than three-fourths of the lane mileage but carry less than one-fourth of the VMT. Interstates and other expressways, in contrast, make up only 6% of the lane mileage but carry 37% of the travel. Statewide on all facility types, vehicle miles of travel increased by 17% between 1983 and 1992. (Major highways are shown in **Figure 5-10**.)

Figure 5-9
Mileage by Roadway Type

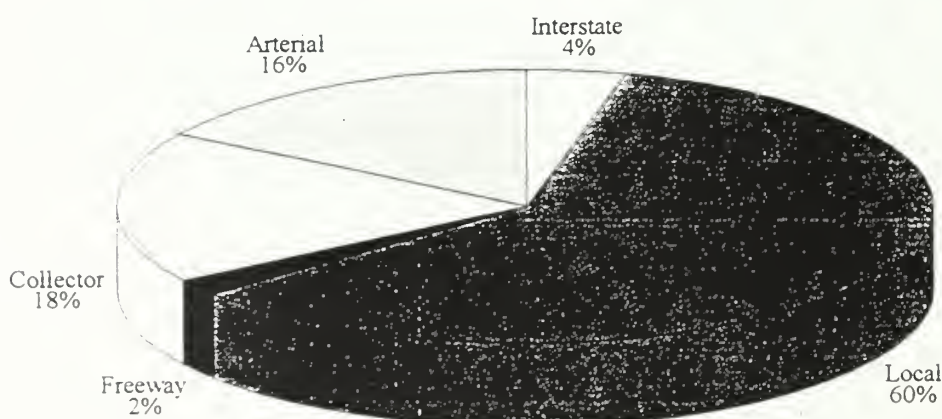
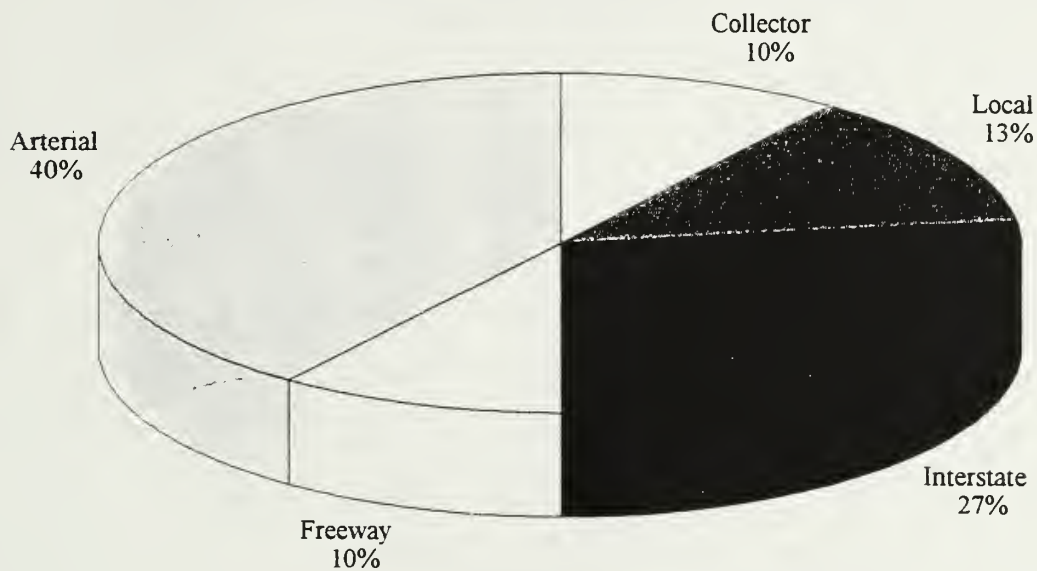


Figure 5-9 (continued)
Annual Vehicle Miles of Travel (1992)



In terms of highway fatalities, Massachusetts has some of the safest roads in the country. With an average of 1.31 fatalities per 100 million VMT, the state has the second lowest number of fatalities per mile driven. The national average is 2.07 fatalities per 100 million VMT.

MHD monitors the condition of roadway pavement that is maintained by the state. In 1992, the condition of these roadways were:

Excellent	Good	Fair	Poor
22%	38%	28%	12%

There are more than 5,000 bridges in Massachusetts under state or local authority. **Table 5-1** shows the number that are under the control of each agency and the percentage that are to standard. Some fail to meet the standards because a portion of the bridge deck, pavement, or supporting structure is deficient. Others are considered substandard because they are functionally obsolete due to inadequate width, the condition of an approaching roadway, or the volume of traffic they now carry. Twenty-eight (28) percent of the nearly 3,000 MHD bridges are functionally obsolete and about 14% are structurally deficient. The balance, 58%, meet federal standards.

Figure 5-10
Major Highways

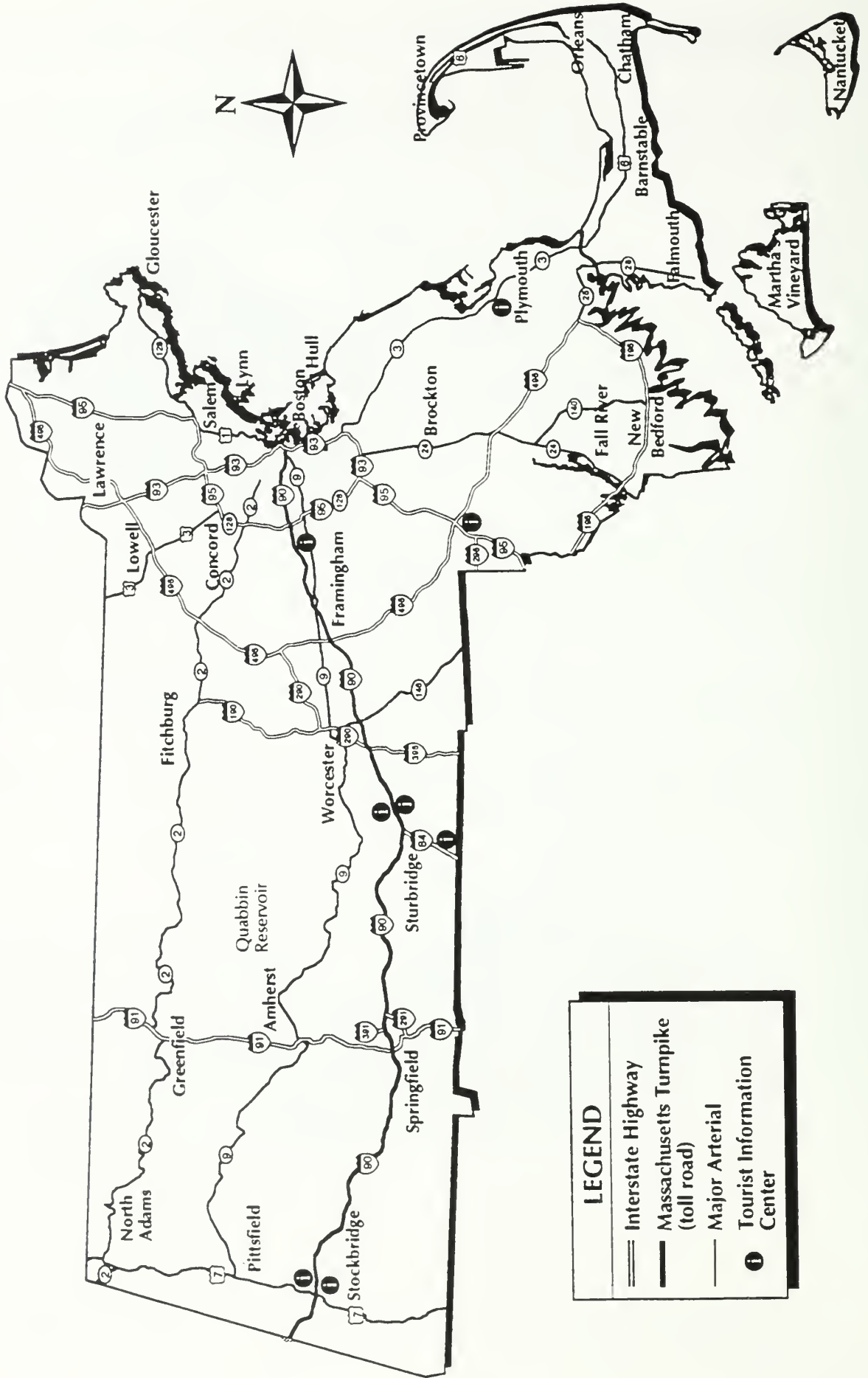


Table 5-1
Bridge Conditions

<u>Responsibility</u>	<u>Number of Bridges</u>	<u>% Meeting Standards</u>	<u>% Obsolete Bridges</u>	<u>% Deficient Bridges</u>
MHD	2,913	58%	28%	14%
Cities and Towns	1,555	55	22	23
Turnpike Authority	350	63	36	1
MDC	104	48	30	22
MBTA	73	34	45	21
Other	<u>42</u>	<u>43</u>	<u>45</u>	<u>12</u>
	5,037	57%	27%	16%

Transit

Massachusetts has an extensive transit system consisting of six modes: commuter rail, light rail, rapid transit, bus, commuter boats and paratransit. The bus, commuter rail, and paratransit, are the only modes that operates outside of the Boston metropolitan area. Transit service is provided by sixteen regional transit authorities or RTAs (see **Figure 5-11**) which, on the average weekday, carry over 746,500 riders and operate 42 locomotives and 244 commuter rail cars, 217 light rail vehicles, 410 rapid transit vehicles, 1,200 buses, 23 trolleys, 700 paratransit vehicles and 8 commuter boats. **Table 5-2** and **Figure 5-12** show ridership distribution by RTA and mode respectively. Together, these riders travel nearly a billion miles annually.

A detailed description of each mode follows. Note that the ridership given for each mode represents total boardings which are higher than total ridership because of transfers between lines or modes. Many people, particularly in the Boston area, transfer between lines and or modes in order to make a complete trip.

Figure 5-11
Regional Transit Authorities

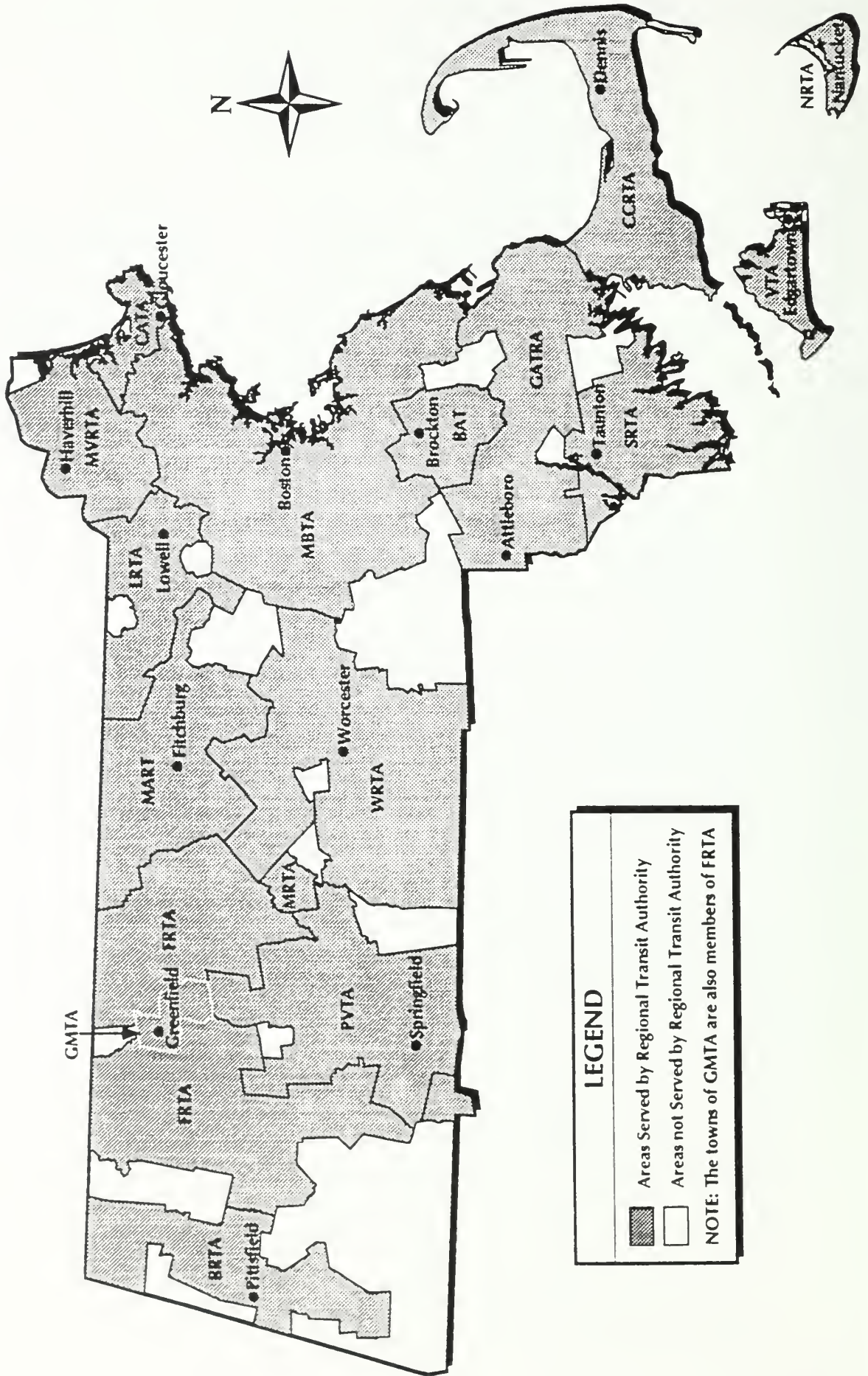


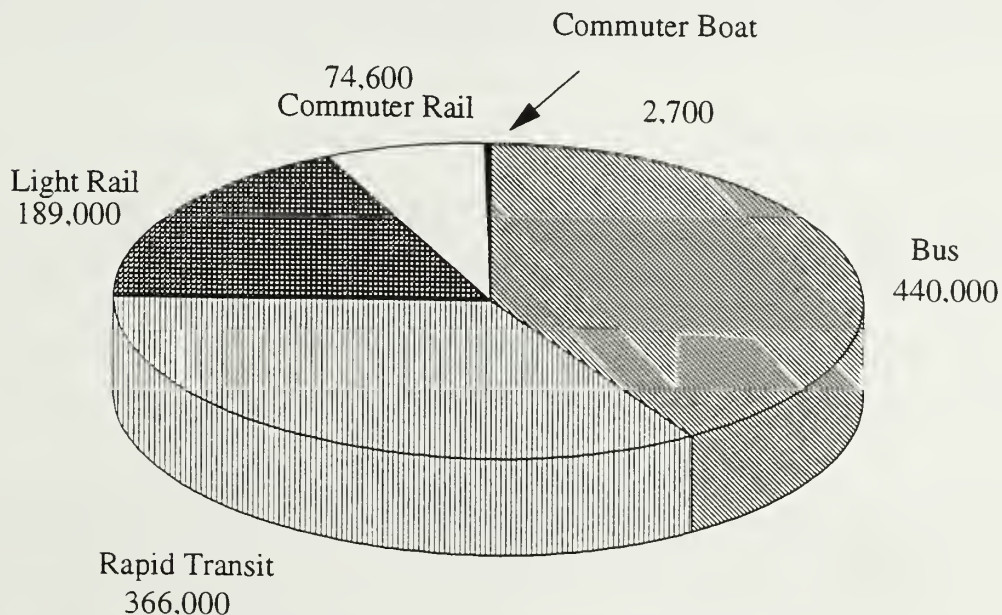
Table 5-2
RTA Average Weekday Fixed Route Ridership

<u>RTA</u>	<u>Ridership*</u>
MBTA (Massachusetts Bay)	646,500
PVTA (Pioneer Valley)	41,450
WRTA (Worcester)	14,350
SERTA (Southeastern Massachusetts)	13,150
BAT (Brockton Area)	12,200
MVRTA (Merrimack Valley)	4,900
LRTA (Lowell)	4,550
BRTA (Berkshire)	2,550
MART (Montachusets)	2,550
GATRA (Greater Attleboro)	2,100
CATA (Cape Ann)	700
GMTA (Greenfield-Montague)	550
VRTA (Martha's Vineyard)**	700
CCRTA (Cape Cod)	200
FRTA (Franklin)	50
Average Weekday Total	743,500

*Ridership numbers rounded to the nearest 50 riders

**Seasonal Service

Figure 5-12
Average Weekday Ridership by Mode



Commuter Rail

The commuter rail system is run by Amtrak for the MBTA and consists of 11 radial lines that operate in and out of the city of Boston (see **Figure 5-13**). The network consists of 265 route miles and 101 stations, 39 of which are wheelchair accessible. Lines on the north side of the system terminate at North Station where passengers have the opportunity to transfer to either of two rapid transit lines. Lines on the south side of the system terminate at South Station where passengers can transfer to a rapid transit line, to intercity train service, local bus service, or to intercity bus service. Approximately 83,170 trips are made on the commuter rail system on the average weekday.

Light Rail

The light rail system, otherwise known as the Green Line (see **Figure 5-14**), operates in Boston, Brookline, Cambridge, and Newton. The system consists of four radial routes that operate over 23 miles of track and stop at 13 subway or elevated stations and 57 surface stops. The light rail system connects directly with each of the rapid transit lines. Because the service is operated with high platform vehicles, none of the stops and stations are currently wheelchair accessible. Approximately 189,000 trips are made on the light rail system (Green Line) on the average weekday.

Rapid Transit

The rapid transit system (see **Figure 5-14**) consists of 53 stations on three radial lines: the Red Line (21 miles), the Orange Line (11 miles), and the Blue Line (6 miles). Over half (54% or 29) of the stations are wheelchair accessible. All lines provide service to downtown Boston and all lines except the red and blue lines connect directly with each other and with the Green Line. Park and ride lots are located at many of the stations. Local bus service operates in and out of quite a few stations, particularly those located at the ends of lines. Rapid transit service is located below the intercity and South Side commuter rail terminal in Boston and across the street from the North Side commuter rail terminal. Average weekday ridership is approximately 366,000 trips, 185,000 of which are made on the Red Line; 127,000 on the Orange Line; and 54,000 on the Blue Line.

Bus and Trackless Trolley

Fixed-route bus service is the most widespread form of public transportation in the state. Most of the RTAs operate or contract for fixed-route bus service. Five RTAs - Cape Cod Regional Transit Authority (CCRTA), Franklin Regional Transit Authority (FRTA), Greenfield-Montague Transportation Area (GMTA), Nantucket Regional Transit Authority (NRTA), and Martha's Vineyard Transit Authority (VTA) offer very limited service. The MBTA offers electric trackless trolley service, which is essentially the same as fixed-route bus service, on several routes. (Trackless trolleys are electric vehicles that get power from overhead wires rather than from on-board batteries.)

In the MBTA district, nearly all bus routes connect with the rapid transit system or the light rail system in at least one location. In areas closer to Boston, buses provide cross-town service, feeder service to rapid transit stations, and line haul service in heavily congested areas. Further out, buses provide local service and connections to rapid transit and some commuter rail lines.

Over 1200 buses and trackless trolleys accommodate approximately 440,000 passenger trips on the average weekday.

Commuter Boats

Commuter boat service operates between Hingham and Rowes Wharf in Boston; between Rowes Wharf and Logan Airport; between the Charlestown Navy Yard and Long Wharf in Boston; and between Boston and Point Pemberton in Hull. The service, most of which is operated for the MBTA by private carriers who use their own vehicles, is provided with 8 boats. Approximately 2700 passenger trips are made on the average weekday.

Paratransit

Most RTA's operate or contract out for paratransit service for people with disabilities who cannot travel on conventional buses and trains. Paratransit service generally consists of lift-equipped vans which provide door-to-door transportation service. Over 11,000 trips are made on approximately 700 vehicles on the average weekday. In addition, many cities and towns, Councils on Aging, and charitable organizations operate wheelchair accessible services.

Intercity Bus

In addition to the national service provided by Greyhound, Massachusetts is served by five major private intercity bus carriers. In the eastern part of the state, Boston is the main terminal or transfer point for routes from Vermont, Maine, New Hampshire, states to the south and various Massachusetts communities. In the central part of the state, Amherst is the terminal point for service from New York City and service from Boston with intermediate stops in Springfield and Worcester. The city of Springfield acts as the terminal or transfer point for service from Albany and Boston. Routes that provide service between Vermont and Connecticut also stop in Springfield.

Rail - Intercity Passenger and Freight

Intercity rail service is provided by Amtrak on five routes: the Northeast Corridor Route, the Inland Route, the Lake Shore Limited, the Montrealer, and the Cape Codder. (See **Figure 5-15**) About 46% of annual Amtrak boardings in the six northeastern states occur in Massachusetts.

The Northeast Corridor trains run from Boston to New York City via Providence, Rhode Island and New Haven, Connecticut with continuing service to Washington, D.C. There are twelve daily round trips.

Inland Route trains run from Boston to New York City via Framingham, Worcester, Springfield, and Hartford and New Haven in Connecticut. The route has 4 round trips daily.

Figure 5-13
Commuter Rail System

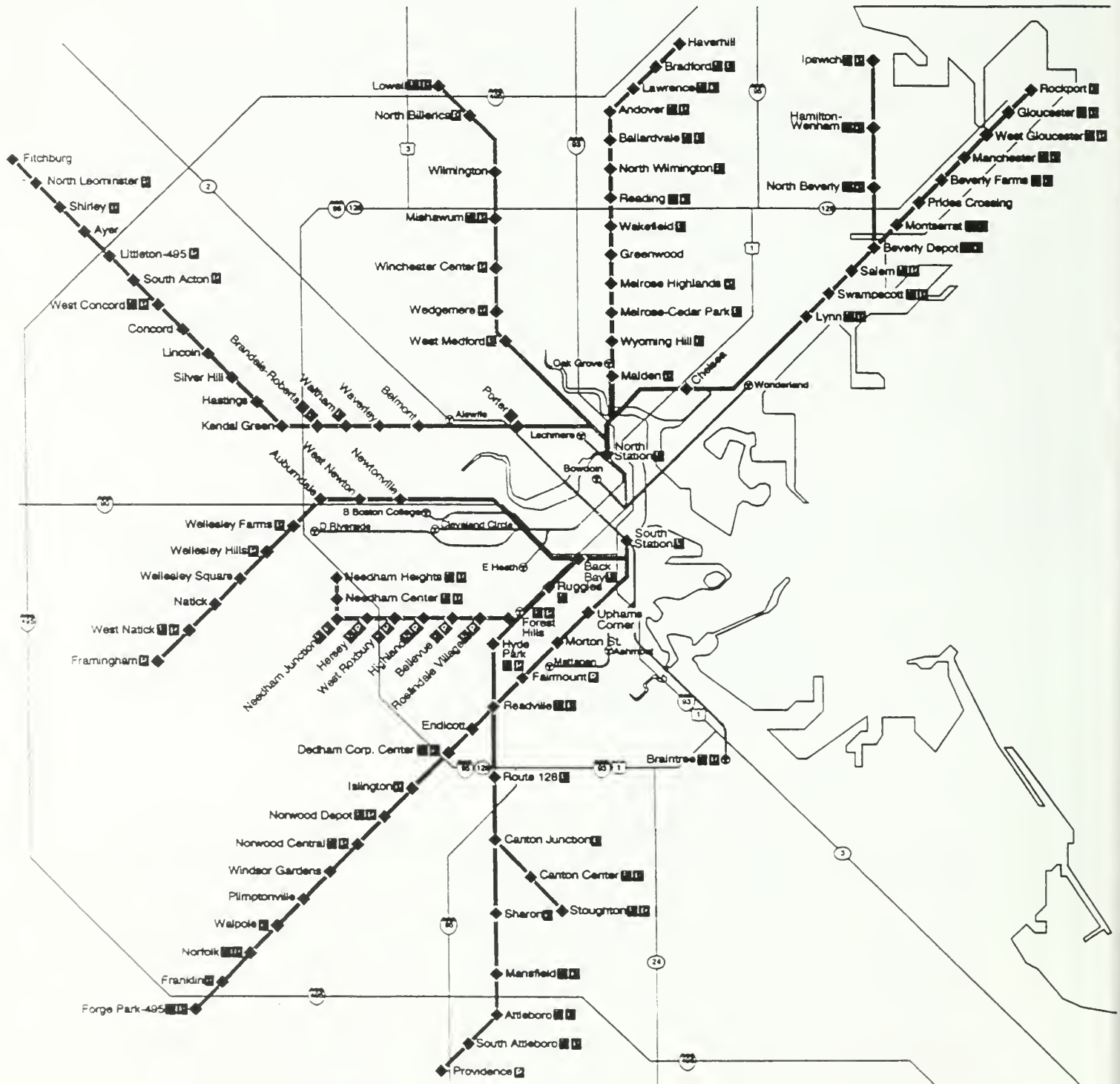
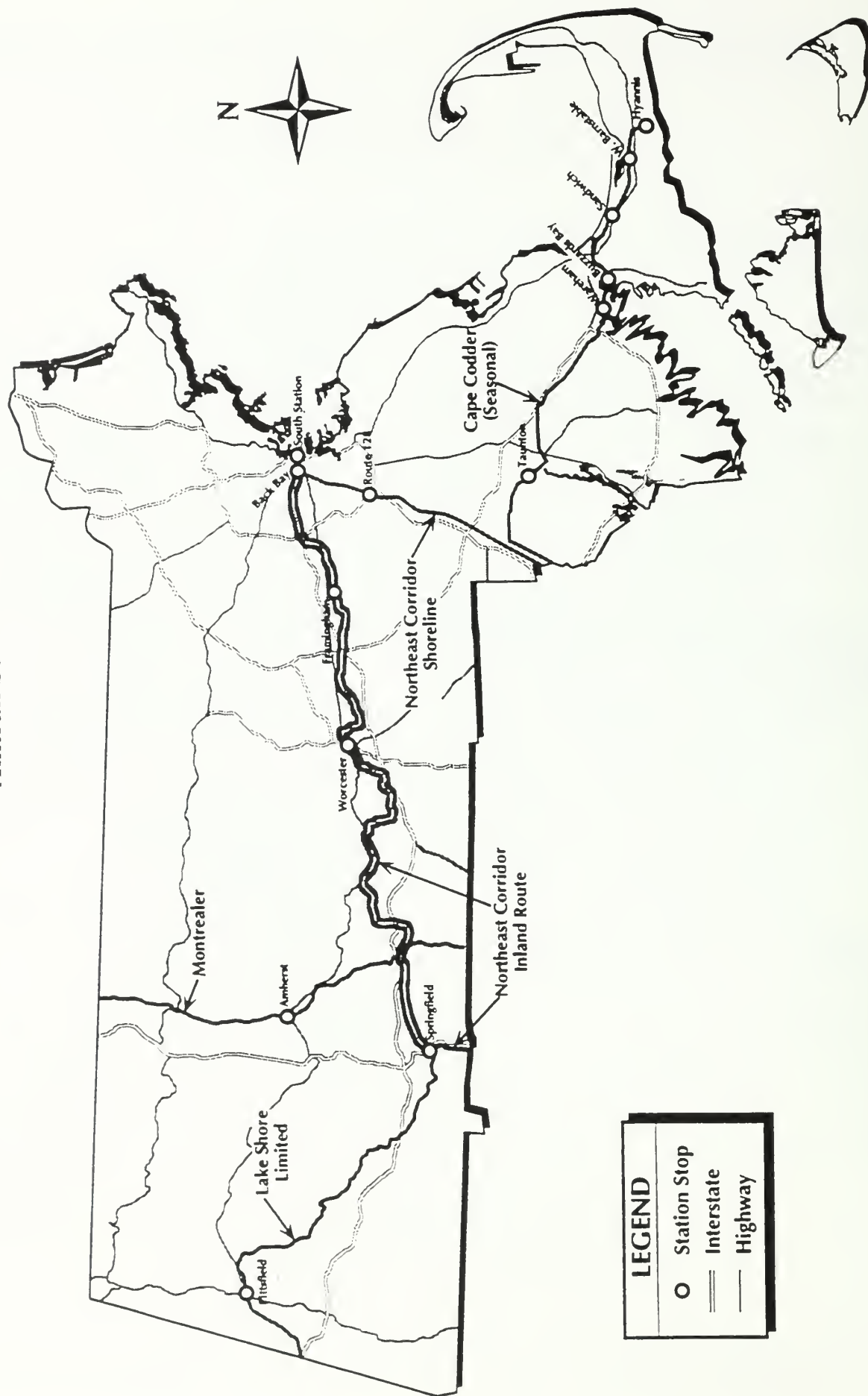


Figure 5-15
Amtrak Service



Lake Shore Limited service operates one run daily between Boston and Chicago with Massachusetts stops in Framingham, Worcester, and Pittsfield.

Trains on the Montrealer route run between Montreal and New York City. Amherst is the only Massachusetts stop on this route. There is one daily run in each direction.

Service on the Cape Codder route is provided between Hyannis on Cape Cod and New York City on weekends during the summer. The route runs from Hyannis to Taunton, and then to Providence where it follows the Northeast Corridor route south to New York City.

Average daily ridership on the non-seasonal routes is approximately 3500. Average weekend day ridership on the Cape Codder Route is 186.

Ten rail freight carriers operate service over more than 1,000 route miles throughout the state (42% of this mileage is publicly owned). These carriers provide essential transportation connections in support of domestic and international trade. While five of the ten carriers operate only within the state, they still transfer freight-carrying cars to and from interstate railroads (The *New England Transportation Initiative Inventory Report*, February 1994). (See **Figure 5-16** for major carriers.)

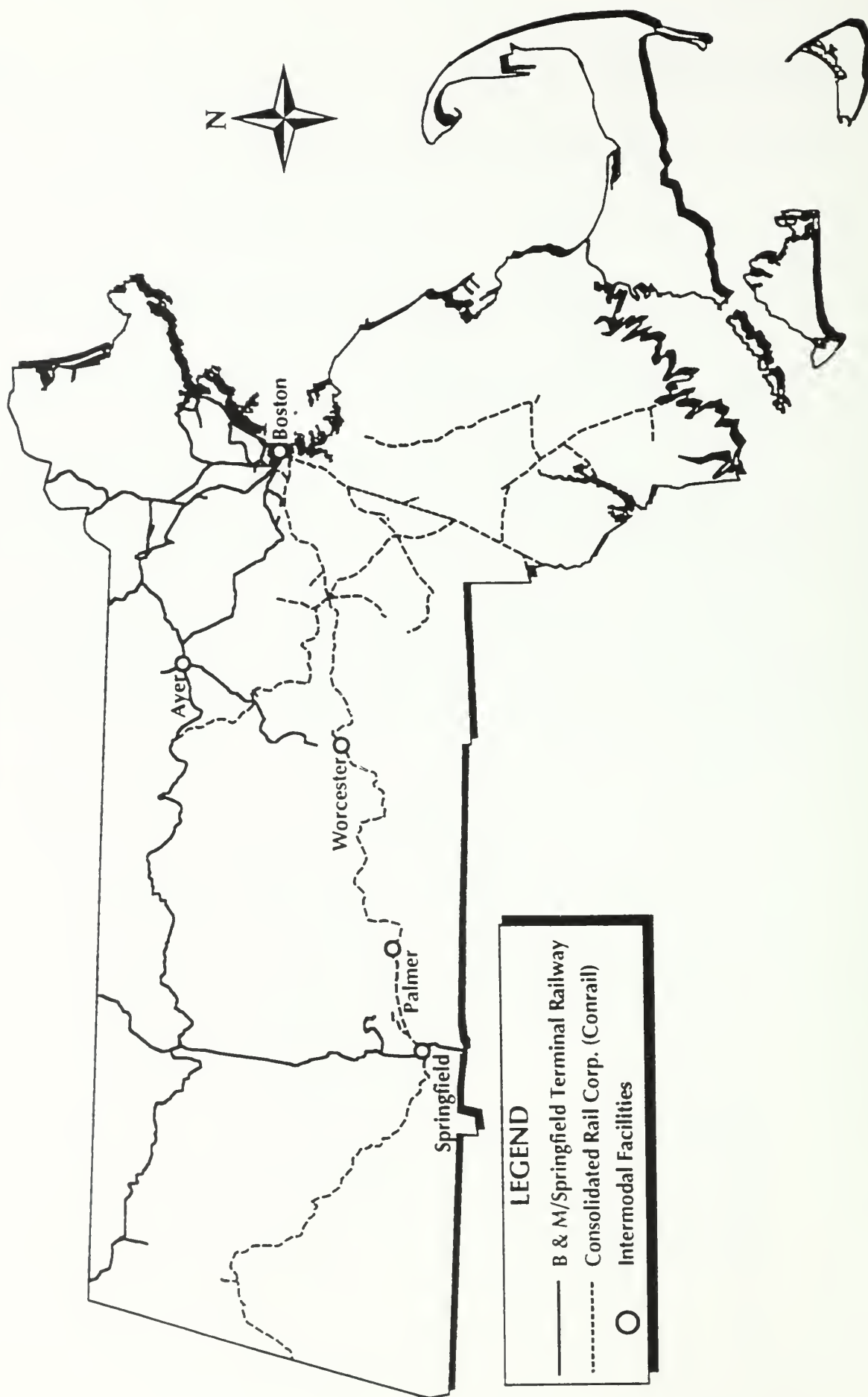
Main line routes connect the state to Chicago and points west and south, as well as to international services via the Port of Boston (the Moran Terminal in Charlestown and the Conley Terminal in South Boston) and West Coast ports. Intermodal service centers in Worcester, Springfield, Palmer, Ayer, and Boston, provide cost-effective container freight transfer and handling for a wide-range of commodities. **Table 5-3** lists the carriers by railroad type.

Table 5-3
Rail Freight Carriers

<u>Carrier</u>	<u>Railroad Type</u>	<u>Route Mileage</u>
Consolidated Rail Corp. (Conrail)	Class I	417.5
Boston & Maine/Springfield Terminal RR	Class II	335.2
Central Vermont Railway	Class II	55.0
Providence & Worcester Railroad	Regional	68.1
Bay Colony Railroad*	Local	120.2
Grafton & Upton Railroad*	Local	14.1
Housatonic Railroad	Local	35.9
Pioneer Valley Railroad*	Local	27.6
Quincy Bay Railroad*	Local	2.0
Massachusetts Central Railroad*	Switching and Terminal	23.4

*Operates within the state only

Figure 5-16
Major Freight Rail Carriers



Air Passenger and Freight Transportation

Massachusetts has 173 airport facilities (52 public, 121 private) that serve a variety of passenger and freight operations (**Figure 5-17** shows the major facilities). The busiest, in terms of passenger enplanements and cargo is Logan International Airport located in Boston.

Logan, which is the 10th busiest passenger airport in the country, serves as the primary gateway for air travel for the New England Region. Massachusetts accounts for 45% of the region's population, however, 63% of the region's enplanements are made at Logan. Over 15% of passengers and 29% of cargo enplaned at Logan are headed for international destinations.

According to the New England Transportation Initiative Draft Inventory Report (February 1994), Logan has the highest usage of alternative ground access services of all the airports in New England: 10% of passengers arrive at the airport by rapid transit; 9% use express buses; and 0.5% use passenger ferries.

Table 5-4 shows airplane departures, the number of boarding passengers, and the tons of freight enplaned at airports in the state in general and at Logan in particular.

Table 5-4
Statewide Airport Activity for Certified Route Air Carriers

Statewide <u>Totals</u>	Aircraft <u>Departures</u>	Enplaned <u>Passengers</u>	Enplaned Cargo <u>Freight/Mail (Tons)</u>
Massachusetts	115,970	9,155,605	152,600
Logan International Airport Activity*			
Logan <u>Airport</u>	Aircraft <u>Departures</u>	Enplaned <u>Passengers</u>	Enplaned Cargo <u>Freight/Mail (tons)</u>
Domestic	218,970	9,705,261	153,523
International	19,327	1,779,361	62,710

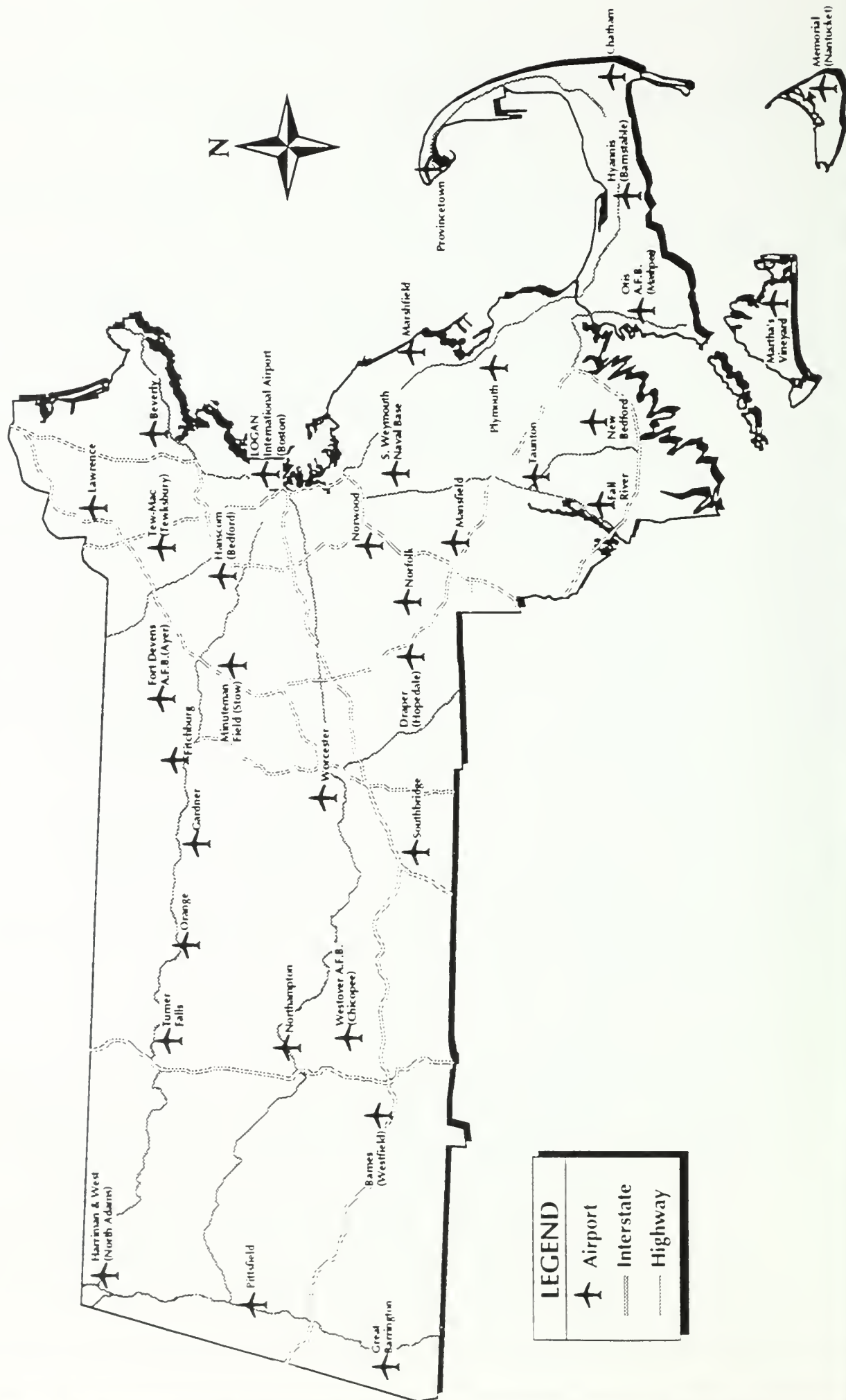
*Logan statistics are higher than statewide totals because of the inclusion of international and general aviation aircraft operations.

Port Facilities

Massachusetts has a number of port facilities that support the shipping of freight, as well as fishing, water transportation and maritime recreational needs. According to the U.S. Army Corp. of Engineers' *Waterborne Commerce Statistics*, in 1991 three Massachusetts ports (Boston, #32; Fall River, #87; and Salem, #123) were among the top 150 ports in the country in terms of total tonnage. The bulk of the shipments are petroleum that is destined for use throughout New England.

The Port of Boston (Moran Container Terminal, Conley Terminal and Harbor Gateway Terminal) is also the region's major gateway for international shipping. More than two dozen steamship lines serve the port and connect the area with 175 world ports either directly or through feeder barge

Figure 5-17
Massachusetts Airports



service via New York. The Port's major trading partners are Japan (37% of international trade) and northern Europe (34%), followed by the Mediterranean countries, Australia/New Zealand, and South America (NETI Inventory Draft Report, February 1994).

The major ports handling freight shipments are listed below.

Table 5-5
Waterborne Freight Shipments

<u>Port</u>	<u>Tons Handled</u>	<u>Main Commodities</u>
Boston*	13,435,000	Petroleum, raw materials
Fall River	4,413,000	Coal, petroleum
Salem Harbor	1,466,000	Coal, Petroleum
New Bedford & Fairhaven	406,000	Petroleum, fish
Woods Hole	208,000	Petroleum

*includes Chelsea Creek, Mystic River, and Weymouth/Fore River

Boston is once again becoming a popular port of call for cruise ships. In 1992, 34 cruise ships docked at Black Falcon Terminal. A cruise ship line will begin every other week cruises to Bermuda in 1994.

An extensive network of year round and seasonal passenger service exists for the coastal area. The most active non-commuter ferry routes are to and from Martha's Vineyard, Nantucket and the mainline with annual ridership of approximately 2.5 million passengers.

Bicycle Facilities

People who commute to work by bicycle as well as recreational riders can take advantage of a number of bicycle paths. The table below lists the state's long-distance bicycle paths. The 155 mile Claire Saltonstall Bikeway which runs from Boston to Provincetown with a spur from the Cape Cod Canal to Woods Hole is the only long distance recreational route in the state.

Table 5-6
Existing Long-Distance Bicycle Facilities

<u>Facility</u>	<u>Length</u>	<u>Location</u>
Claire Saltonstall Bikeway	155 miles	Boston to Provincetown, Cape Cod Canal to Wood's Hole
Cape Cod Rail Trail	20.0 miles	Dennis to Eastham
Dr. Paul Dudley White Path	17.9 miles	Boston, Cambridge, Watertown, Newton
Minuteman Commuter Bikeway	11.1 miles	Bedford, Lexington, Arlington
Norwottuck Rail Trail	8.5 miles	Northampton, Hadley, Amherst

Extensive bicycle path systems are found on Martha's Vineyard and Nantucket.

Rideshare Programs

Massachusetts contracts with a private nonprofit commuter services company to provide comprehensive transportation services to commuters and their employees to facilitate transit and shared-ride transportation alternatives to drive-alone commuting. Acting as a liaison between the public and private sectors, this company serves a client base of nearly 1,000 corporations, with 150 active projects, to create transportation programs for employers and communities.

The rideshare company also works with public and private decision-makers in forming and assisting Transportation Management Associations (TMAs) to improve commuter mobility on an areawide basis. TMAs are generally private non-profit organizations formed by businesses to address traffic and transportation issues in a specific geographic area. There are currently seven TMAs in the Commonwealth.

Several other private and non-profit companies also provide vanpool services.

TRAVEL PATTERNS AND TRENDS

In many ways, travel patterns and trends in Massachusetts are similar to what is happening in the rest of the country. Person trips have increased at a rate that is higher than population increases; Auto use has increased, seemingly at the expense of other modes; and vehicle miles of travel (VMT) are steadily increasing. Other trends differ significantly however. An example of the latter is transit usage which is higher than the national average.

This section will discuss how, where, and the degree to which Massachusetts residents travel as well as the truck freight movements in the state.

Person Trips

The National Personal Transportation Survey (NPTS), conducted by the U.S. Department of Transportation every seven years, is the best source of data for total person trips. According to the 1990 survey, approximately 14.7 million person trips are made in Massachusetts on an average weekday. Data from previous surveys are not available for the state but it is almost certain that the total number of person trips has increased faster than the general population. As mentioned previously, the state's population increased by 6% between 1970 and 1990. However, households increased by 27% during the same period. Since there is a minimum number of trips that is associated with each household, a larger number of households means a greater number of person trips.

Table 5-7 shows the proportion of person trips of each type that are made on all the modes on an average weekday for both the state and the nation (NPTS). It is readily apparent that the private vehicle (auto/truck/van) is the dominant mode for all types of trips. Eighty-one (81) percent of all person trips in Massachusetts are made in private vehicles. There are no statistics available to indicate the actual change in the mode share captured by the private vehicle for all types of trips, however, it is safe to assume that here, as in the rest of the country, the share captured has increased. VMT increased by 15% between 1983 and 1992.

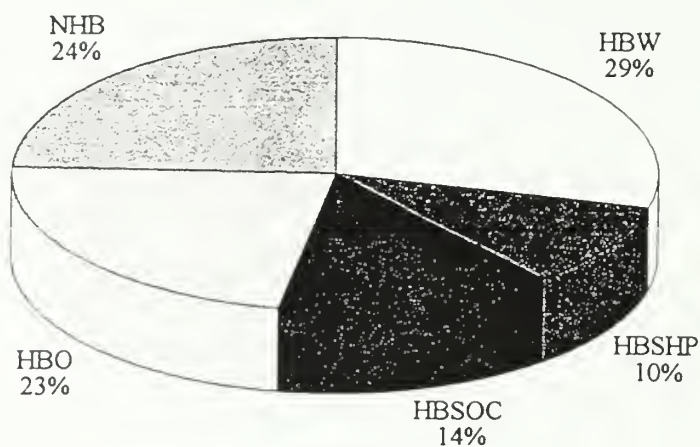
In addition to the 81% of all trips that are made by auto/truck/van, 12% are walk trips; 3% are made on public transportation; and 4% are made on other modes. Nationwide, 8% of all average weekday person trips are walk trips and 2% are transit trips versus the 12% and 3% respectively in Massachusetts (see **Table 5-7**). Massachusetts residents are more likely to walk or make transit trips than the nation as a whole.

Twenty-nine percent (29%) of all trips are home-based work trips; 47% are home-based other trips (social, recreation, school, shopping); and 24% are non-home based (see **Figure 5-18**). A large proportion of the latter type of travel are work related trips such as leaving the office to attend a meeting and returning to the office.

As was mentioned previously, transit usage in Massachusetts is higher than the national average. **Figure 5-19** shows the proportion of each type of trip that is made on public transportation. Almost half (46%) of these trips are made to and from places of employment.

Because of the journey-to-work questions asked during the U. S. Census, more comprehensive data are available on commuting or work trips than on any other trip purpose. Although these trips account for less than a third (29%) of total travel, they have tremendous impacts on traffic congestion and air quality since most of them tend to be concentrated during a few select "peak" hours. Commuting is at the core of many of the issues of transportation for it is the morning and afternoon peaks, the rush hours each weekday, that determine which roads and transit systems are most needed. Transportation infrastructure must be designed to serve the peak volume, not merely the average traffic volume spread over an entire day. In addition, data seem to indicate that the private vehicle

Figure 5-18
Average Weekday Person Trips



mode share is increasing for work trips while the shares for most other modes are decreasing. (Note that the share of trips made in single-occupant vehicles has increased while the share made in carpools has decreased.)

TABLE 5-7

**AVERAGE
WEEKDAY
PERSON TRIPS
BY PURPOSE
AND MODE**

Massachusetts

Mode of Travel	Home Based Work	Home Based Shopping	Home Based Soc/Rec	Home Based Other	Non-Home Based	All Purposes
Car/Truck/Van	83%	79%	85%	76%	83%	81%
Transit	5%	3%	NA	4%	2%	3%
Walk	11%	17%	12%	11%	13%	12%
Bicycle	NA	2%	2%	1%	NA	1%
Other	1%	0%	NA	8%	2%	3%
All Modes	100%	100%	100%	100%	100%	100%

United States

Mode of Travel	Home Based Work	Home Based Shopping	Home Based Soc/Rec	Home Based Other	Non-Home Based	All Purposes
Car/Truck/Van	91%	90%	83%	76%	90%	85%
Transit	4%	1%	1%	3%	1%	2%
Walk	4%	8%	13%	9%	7%	8%
Bicycle	0%	1%	2%	1%	0%	1%
Other	1%	0%	1%	12%	2%	4%
All Modes	100%	100%	100%	100%	100%	100%

Source: National Personal Transportation Survey (NPTS)

Figure 5-18
Average Weekday Person Trips

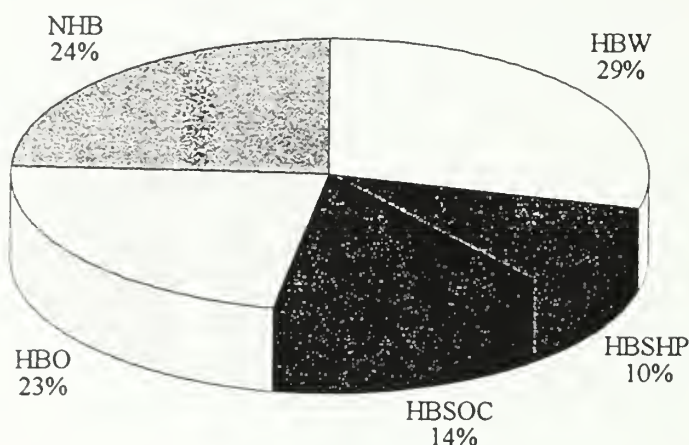
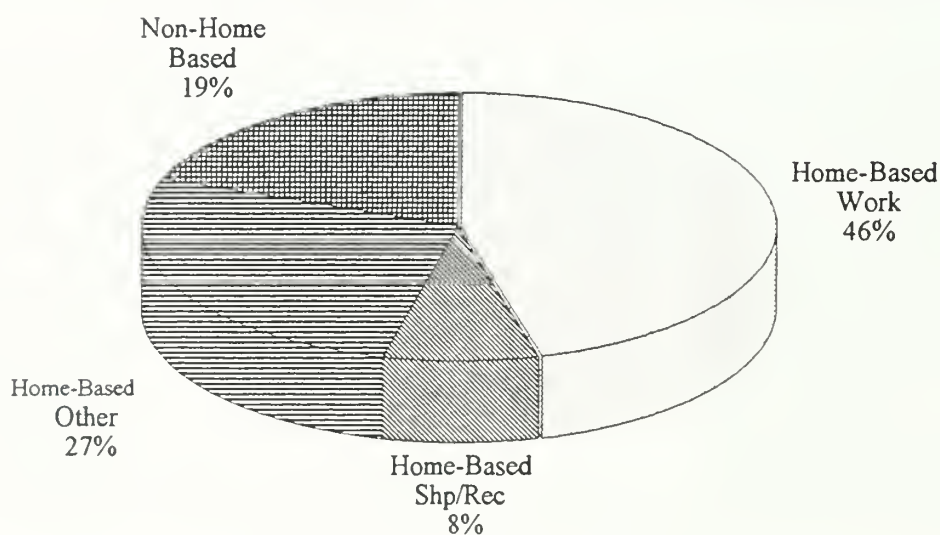


Figure 5-19
Public Transportation Trips by Trip Purpose



The U.S. Census provides the best current and historical data on the work trip. (Note that the proportion of work trips made on transit or by walking differ from those reported by the NPTS. The difference may be due to the smaller sample size and the margin of error associated with the NPTS.) Table 5-8 presents the data on work trips for 1980 and 1990. According to the Census, the number of workers in Massachusetts increased by 14% during this period. The proportion of workers who

commute by private vehicle (either as a driver or passenger) increased from 80 to 83%. However, the absolute number who commute by private vehicle showed a more substantial increase of 17%. All of the increase, unfortunately, occurred in the use of single-occupancy vehicles whose mode share increased from 61% to 72% while the carpool mode share decreased from 19% to 11%. Average auto occupancy decreased from 1.15 to 1.14 persons per vehicle during this period. Factors contributing to the increase in the single-occupancy vehicle mode share are the seemingly abundant supply of gasoline at reasonable prices and the recession that existed when the 1990 census was taken. In the latter case, fewer jobs probably lessened the opportunities to carpool.

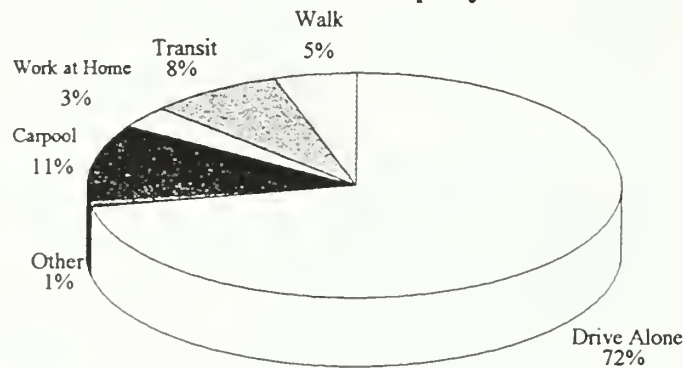
The proportion of workers who use transit has decreased (from 9% to 8%) while the absolute number has increased. In the Massachusetts Bay Transportation Authority (MBTA) district where most of the state's transit usage occurs, the transit mode share decreased by 0.3% between 1980 and 1990. However, MBTA actual ridership increased by almost 20% between 1983 and 1993.

A point of interest is the number of people who work at home. The absolute number increased by 93% while the mode share increased from 1% to 3%. At this time, the number is still quite small. However, if this trend continues, at some point, it could have impacts on traffic congestion and air quality because it would eliminate travel during the most congested periods of the day.

Work trips in 1990 by mode are presented graphically in **Figure 5-20**. Note that a carpool is defined as a vehicle with two or more occupants.

<div>U.S. CENSUS: MASSACHUSETTS WORK TRIPS BY MODE</div> <div>TABLE 5-8</div>					
MODE	1980	% of TOT	1990	% of TOT	%80-90
DRIVE ALONE	1,600,929	61%	2,150,200	72%	34%
CARPOOL	501,912	19%	318,000	11%	-37%
TRANSIT	243,611	9%	247,381	8%	2%
WALKED	206,557	8%	161,820	5%	-22%
OTHER	31,304	1%	29,447	1%	-6%
WORKED AT HOME	38,725	1%	74,855	3%	93%
TOTAL WORKERS	2,623,038	100%	2,979,594	100%	14%

Figure 5-20
1990 Work Trips by Mode



Overview of Commuting

As was previously mentioned, morning and afternoon rush hours or the commuting peak periods determine which roads and transit systems are most needed. Thus, it is important to understand the patterns of commuting in the state.

The commuting patterns for eight of the largest cities in the state are described below. There are some striking differences in the patterns because of differences in types of employment (see **Figure 5-21** for a graphic representation of the types of employment found in these communities) and differences in the ways the cities have developed. In general, older job centers have more compact patterns of commuting than recently developed cities.

Boston is the only one of the eight cities discussed here that has a full-fledged mass transit system including buses, rapid transit, commuter rail, light rail, and commuter boats. These modes carry one-third of the commuters to the city of Boston. Several of the other cities are served by local bus systems, but these carry only 2-4% of the workforce. Indeed, for all of the other cities, the most popular commuting mode other than the automobile is walking (4-6% of the workforce).

Boston

Nearly 500,000 work trips are made to the city of Boston each weekday. As would be expected, more trips originate within the city and nearby communities with the number of commuters decreasing as a function of distance. However, a large number of trips are made even from very long distances. Thirty-nine (39) percent or 195,000 workers live in the city. Thirty-two (32) percent or 160,000 trips originate in the communities immediately surrounding the city (defined as the 28 other communities within Route 128). The numbers are smaller between Route 128 and I-495 but the slow rate at which

they diminish demonstrates the strength and extent of the influence of Boston. Communities from beyond I-495, such as Worcester, New Bedford and Barnstable, each have more than 500 residents who commute to Boston. Smaller numbers of people, in the range of 50 to 80, commute from as far away as Springfield, Amherst, and Winchendon.

State boundaries are no obstacle, with nearly 7,000 people commuting to Boston from New Hampshire; over 3,500 from Rhode Island; and smaller numbers commuting from Maine, Vermont, New York, and Connecticut. Some of these commutes can take up to two hours each way.

The number of commuters to Boston is closely correlated with transportation access to the core. The communities that send the highest number of commuters to Boston either have public transportation or are located on a major expressway or both.

The pattern of Boston commuters has changed since 1980 with a greater presence of more distant residences. Cities and towns showing the fastest growth in Boston commuters generally lie along and outside of Route I-495. A comparison of the longest commutes from 1989 and 1990 Census data shows that the longest distance commutes have increased in length. In 1980, small numbers of people came from the southern part of York County, Maine, and from New Hampshire as far north as Concord. In 1990, small numbers of people were coming from as far north as Portland and parts of Cumberland County, Maine and from northern and western parts of New Hampshire, including Plymouth, Keene and Sunapee.

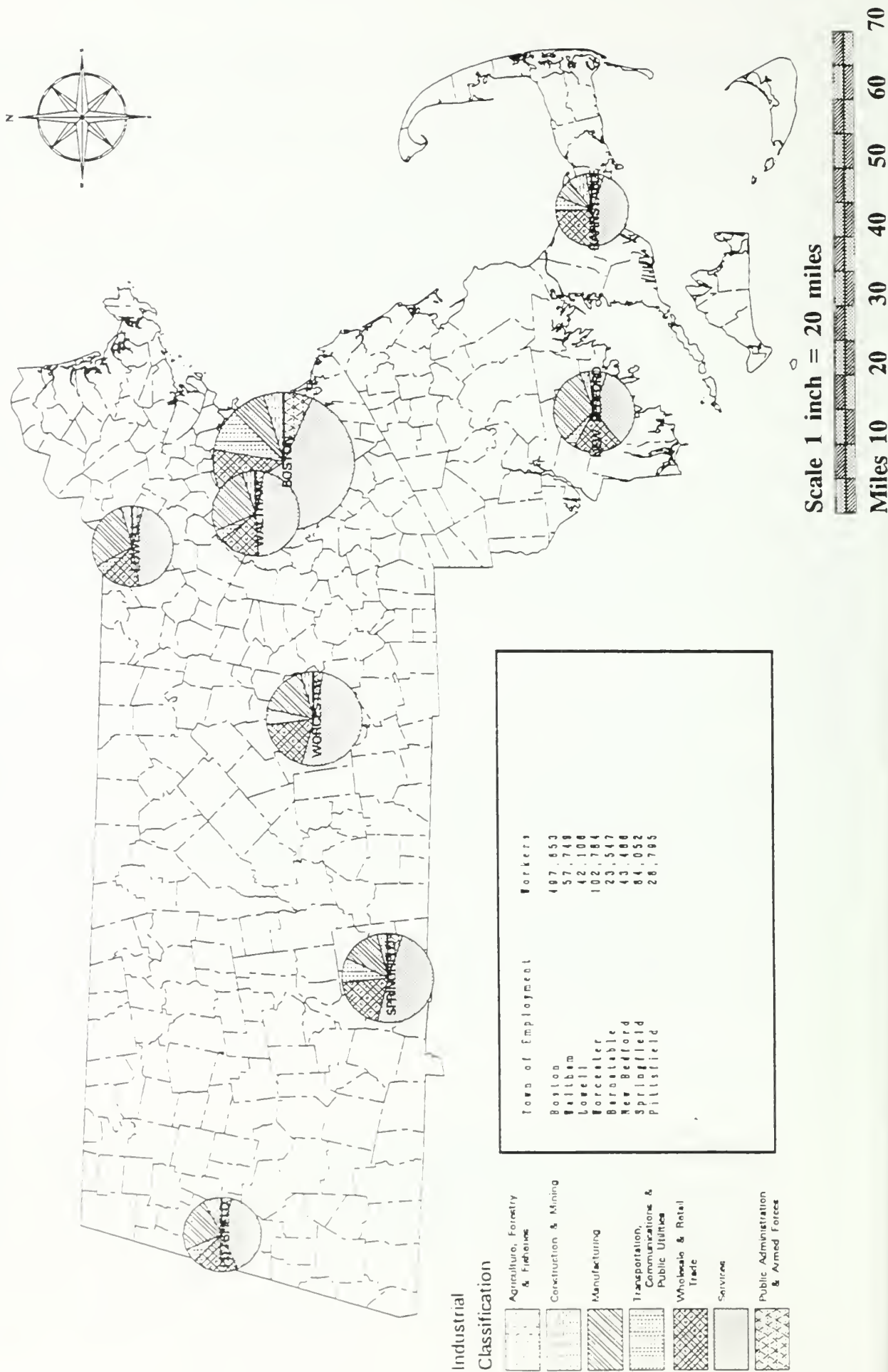
Worcester

A little over 100,000 people are employed in the city of Worcester which is the third highest employment center in the state (Cambridge is the second). Half of the jobs are held by residents of the city. Compared to Boston, Worcester's commuting pattern is relatively compact, with all towns housing more than 1,000 workers lying within a 20 mile radius. Some communities from which 1000 Boston workers originate are 40-50 miles from the city. Much of this difference is due to Boston's higher level of employment, but it may also be due to the type of employment available in the two cities. A majority (72%) of the jobs in Boston are in services, government, finance, insurance and real estate. While in Worcester, even though services are the dominant sector (34%), there is a greater emphasis on retail (21%) and manufacturing (17%) than in Boston. Retail jobs tend to generate shorter commutes than other types of jobs because they do not require specialized skills. If specialized skills are not necessary, then it is more likely that employees will be from the local labor pool.

Springfield

Approximately 84,000 jobs, 45% of which are held by residents, are located in the city of Springfield. Springfield's commuting pattern appears to be even more compact than Worcester's with the twenty mile radius encompassing almost every town that sends over 100 workers and certainly every town sending over 500. Like Worcester, a large portion of the employment is in the retail sector (21%), but Springfield also has a large amount of employment in government (16%) which also tends to employ local residents.

Figure 5-21
1990 Census Employment Statistics: Employment by Industrial Classification for Selected Towns



Waltham

Waltham is the largest employment center on Route 128 (57,000 jobs). Even though it employs less people than Worcester or Springfield, its commuting pattern is more spread out. Less than 25% of the workforce resides in the city. Workers in Waltham have commutes that are nearly as long as commuters to Boston. Cities and towns sending more than 200 commuters to Waltham are located as far as 50 miles away. Small numbers of workers come from as far away as Springfield and Barnstable.

One reason Waltham draws employees from such distances may be that much of the employment in the city is in high-tech industries (62% -27% manufacturing, 35% service including software development). These jobs call for specialized skills and must draw from a very large labor pool.

Many of the manufacturing jobs in Waltham are relatively new, having been created in the last ten to fifteen years. Recent office construction has focused on the Route 128 corridor, and developers have highlighted its superior highway access as a lure to the high-tech firms. However, during this period, there has been a steep increase in housing prices in eastern Massachusetts, and especially in the towns surrounding Waltham. Workers filling the newly created jobs have often been forced to look far beyond the city to find an affordable home, and have then used the highway access to get to their jobs.

The best characterization of Waltham's commuting pattern is "dispersion" with many towns in the 100-499 category and relatively few towns in the higher categories. This pattern is in sharp contrast to the concentrated patterns exhibited by the older cities which did not experience a recent large increase in employment.

New Bedford

New Bedford is a mid-sized city with approximately 43,500 jobs. Employment in this old maritime city is dominated by manufacturing which accounted for 33% of all jobs in 1990. As is characteristic of this type of employment, nearly 60% of the jobs are held by residents of the city.

The commuting pattern for New Bedford is very compact because jobs in the city were established before the era of easy highway access and the ready availability of automobiles. Virtually every town from which more than 100 people commute falls within a twenty mile radius.

Lowell

The city of Lowell is a mixture of the old and the new. A booming mill town in the 19th century, Lowell declined in the post-war period, but has recently experienced a revitalization with the influx of the high-tech industry. Employment grew strongly through the mid-1980s under the influence of the Wang Corporation, but has since fallen off. 1990 employment was just over 42,000 jobs.

Many people who commute to Lowell live in communities surrounding the city reflecting the older character of some of its employment. Lowell's employment is even more focused on manufacturing than New Bedford's due to the presence of older manufacturing jobs in electrical machinery and

newer jobs in computers. Manufacturing accounts for 38% of the employment which is high relative to other cities in the state.

Forty-three percent of all workers live in the city and an additional 17% commute from Chelmsford, Dracut and Tewksbury. Communities from which at least 100 workers commute are more spread out than they are for New Bedford and Springfield. This fact may reflect the newer component of Lowell's employment, the high-tech manufacturing jobs which require more specialized skills. Highway access to Lowell is very good. This facilitates the longer-distance commuting trips. Over 5,000 workers commute to Lowell on a daily basis.

Pittsfield

Pittsfield is by far the largest city in the Berkshires, but is on the small side when compared with cities to the east. Twenty-nine thousand (29,000) jobs, 60% of which are held by residents, are located in the city. The other 40% is spread rather evenly over most of Berkshire County. The majority of the jobs (76%) are concentrated in the services (31%), manufacturing (24%) and retail (21%). The manufacturing jobs are mostly associated with a large General Electric facility which builds turbines and other heavy equipment.

Given its relatively small size and the nature of its employment, the commuting pattern for Pittsfield is more spread out than one might expect. The patterns of population and employment in the Berkshires provide some explanation. In general, Berkshire is more sparsely populated than the eastern part of the state. The lack of large numbers of people in these towns implies that there cannot be large numbers of Pittsfield commuters in any of them. Secondly, there are few other competing job centers in the area, especially for manufacturing jobs. The next largest city in the vicinity is North Adams which has less than 7,500 jobs. Thus, other than Pittsfield, Berkshire County residents have relatively few employment options. With the exception of portions of Routes 7 and 20, the relatively uncongested roads allow commuters to travel easily. About 4% of commuters live in New York.

Barnstable

Barnstable is a large Cape Cod town which encompasses many communities such as Hyannis, Hyannisport, Centerville, and Osterville. With 23,500 jobs, it is the largest employment center on the Cape. Nearly 70% of the employment is focused on the service and retail sectors, reflecting the Cape's residential and vacation-oriented character.

Fifty-three (53) percent of all workers live in the town, while an additional 25% commute from Yarmouth, Sandwich, and Dennis. Like Pittsfield, Barnstable stands out among its neighbors in terms of its employment level.

Trip Length and Time

Nationally, there has been an increase in the average trip length from 7.9 miles in 1983 to 9.0 miles in 1990 (NPTS). Massachusetts is similar to national estimates in this respect. This phenomenon, in part, is due to the decentralization of the population. In general, people have moved

away from central cities to the suburbs. Also, (as mentioned previously) the cost of housing, especially in the Boston metropolitan area has caused people to move beyond the inner suburbs to less densely populated outer suburbs where housing is less expensive and there is more buildable land. The decentralization of the job market is another contributing factor.

Table 5-9 lists the average length of trips by purpose and mode for Massachusetts. At eight miles, the average length of all trips is slightly less than the national average of nine miles. Work trips, however, at an average of 12 miles are longer than the national average of 11 miles. In 1980, 31% of the workforce worked outside their county of residence; 34% did so in 1990. This is an indication of the lengthening work trip.

Naturally, longer work trips require more time to complete. It now takes approximately 23 minutes to make the average work trip in Massachusetts. It took approximately 21 minutes in 1980. Work trips in the eastern part of the state tend to take longer than the state average, 24 minutes 1990 and 23 minutes in 1980. According to the NPTS, Massachusetts is one of only nine states that have travel times that are higher than the national average (*New Perspectives In Commuting*, USDOT, July 1992).

TABLE 5-9						
MASSACHUSETTS AVERAGE TRIP DISTANCE BY TRIP PURPOSE AND MODE						
MODE OF TRAVEL	PURPOSE					
	Home Based Work	Home Based Shopping	Home Based Soc/Rec	Home Based Other	Non-Home Based	All Purposes
Car/Truck/Van	13	6	11	7	7	9
Transit	12	2	NA	3	6	8
Walk	1	NA	1	NA	NA	NA
Bicycle	NA	NA	NA	1	NA	1
Other	1	NA	NA	3	9	4
All Modes	12	5	10	6	6	8

Source: National Personal Transportation Survey

Commercial Truck Flows to and from Massachusetts

The approximately ^{273,000}98 million trucks based in Massachusetts travel over 1.7 billion interstate and intrastate miles each year and carry over 82% of all manufactured freight movement. (Note that the number of trucks does not include vehicles for personal use and that many of these vehicles are

registered in other states). According to the American Trucking Association Foundation (ATA) , the amount of freight shipped by truck increased from a little over 50 million tons in 1982 to 88 million tons in 1990. In 1992, trucks carried over 106 million tons of freight to or from Massachusetts.

The majority of trucks based in the state are in private trucking operations. This category includes manufacturing, wholesale, retail, service and other industries owning and operating their own fleets of vehicles (large retail store chains with their own fleet of tractors-semitrailers delivering commodities to the retail outlets from regional distribution warehouses for example). Private trucking operations account for 84% of the total Massachusetts based trucks and 72% of the miles traveled.

Almost three-quarters (72%) of the fleet based in the state travels locally (defined as less than 50 miles). Another 18% of the fleet make short-range trips (50 to 200 miles). Together, the local and short range trips account for 85% of the vehicle miles traveled (52% of VMT are local; 33% are short-range). Clearly, most of the fleets are New England operations. They operate within a 200 mile radius of their Massachusetts base and cover most of southern and central New England. Census figures show that 81% of the trucks based in the state appear in the category of "less than 25% of miles traveled outside base state".

CHAPTER 6

REGULATORY FRAMEWORK FOR TRANSPORTATION PLANNING

This section describes federal and state legislation that mandated and/or influenced the policies of **Accessing the Future**. These influences transcend and, therefore, help to shape an intermodal, economically efficient and environmentally sound transportation network within the Commonwealth.

Enacted by Congress in December 1991, The Intermodal Surface Transportation Efficiency Act (ISTEA) represents the most ambitious overhaul of the nation's transportation programs since the advent of the interstate highway era in the 1950's. It mandates a dramatic change in transportation systems planning, programming and management and contains a mixture of new and continuing programs. The legislation authorizes \$155 billion to be available from the federal government until federal fiscal year 1997; this figure represents unprecedented levels of federal assistance to the various surface transportation programs.

The principles of ISTEA are contained in its Declaration of Policy. This declaration presents the goals of the legislation and also provides states with a framework on which to base their planning efforts. The ISTEA Declaration of Policy (Section 2) states that:

"It is the policy of the United States to develop a National Intermodal Transportation System that is economically efficient and environmentally sound, provides the foundation for the nation to compete in the global economy, and will move people and goods in an energy efficient manner."

ISTEA emphasizes effective maintenance and management of the nation's existing transportation investments. It renews requirements for multi-modal transportation planning and directs states and metropolitan areas to ensure that transportation programs will be consistent with projected available resources. Further, it allows state and local governments greater flexibility in the transfer of funds between highways and other modes. This flexibility is central to the success of ISTEA in Massachusetts. It is designed to help state and local officials choose the best mix of projects without being constrained by overly-rigid federal funding categories or different matching ratios which favor one mode over another. This flexibility means increased funding for activities that enhance the environment, such as wetland conservation, mitigation of damage to wildlife habitat, preservation of historic sites, and highway beautification. In addition, the legislation allows funding for a broad range of activities that contribute to the meeting of air quality standards such as bicycle projects, pedestrian projects, and mass transit projects.

The enactment of ISTEA resulted in the promulgation of rules, by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA), that form a framework for how the states must implement ISTEA. Two categories of rules that govern the transportation planning process are the ISTEA Planning Guidelines and the ISTEA Management and Monitoring Systems rules. Each of these are described in the following section. Other legislation described in this section pertains to environmental or accessibility issues which have a direct effect on the transportation policies presented in **Accessing the Future**. Specific legislation described includes:

- The National Environmental Policy Act (NEPA)
- The Massachusetts Environmental Policy Act (MEPA)
- The Clean Air Act Amendments of 1990 (CAAA)
- The Federal Coastal Zone Management Act/Amendments (CZMA)
- The Energy Policy Act of 1992
- The Massachusetts Energy Plan of 1993
- The Americans with Disabilities Act of 1990 (ADA)
- The National Transportation System Initiative (NTS)

ISTEA PLANNING GUIDELINES (Federal Regulations 23 CFR Part 450.208-336)

There are various planning requirements established by ISTEA that are task specific including regulations regarding the creation of Regional and Statewide Transportation Plans, Regional and Statewide Transportation Improvement Programs (TIP/STIP) and Unified Planning Work Programs (UPWP). These requirements exist for all states and their regions seeking ISTEA (federal) money for projects and programming.

In creating the Statewide/Regional Transportation Plans and Statewide/Regional Transportation Improvement Programs, ISTEA requires states to adhere to guidelines on the following: **data collection and analysis**, **coordination** of planning activities with other public and private entities and existing plans, and an ongoing and proactive **public participation** process.

Data Collection and Analysis

The regulations require inclusion of data analysis used in the development of all plans and programs. For example, use of data taken from existing maintenance programs or the Management and Monitoring Systems should be integrated with the evaluation of transportation innovations as applied to: highways, bikeways, scenic byways, recreation trails, pedestrian programs and traffic analysis. Employment or housing availability should be correlated with land use projections/control and community development data.

Coordination of Planning Activities

Citizens, affected public agencies, representatives of transportation agency employees, other affected employee representatives, private providers of transportation, and other interested parties must have a reasonable opportunity to comment on the proposed planning efforts.

Public Participation

ISTEA requires that the above planning efforts be integrated with a proactive and ongoing public participation process. The state and regions are required to provide complete public information, timely public notice, full public access to key decisions, and opportunities for early and continuing involvement. This includes a process for seeking out and considering the needs of those traditionally underserved by the existing transportation system. A periodic review of the

effectiveness of this public involvement process must be conducted. The publishing of public involvement procedures, with a 45 day comment period, is required. At a minimum the following forms of outreach and communication are to be a part of any state or regional public involvement plan:

- Access to plans and programs must be provided to citizens, affected public agencies, representatives of transportation agency employees, and private providers.
- Transportation organizations such as: traffic monitoring, ridesharing, parking, and enforcement agencies, airport and port authorities, toll authorities, and private transportation providers shall be included in the process.
- Local, state, and federal environmental resource and permit agencies, as appropriate shall be involved.
- Public meetings, mailings to interested parties, and information sessions should be organized to the extent appropriate.
- A report on the disposition of comments related to draft plans and TIPs shall be developed.
- Additional opportunity for public comment should be provided if final plans or TIPs are significantly different from draft documents.

The Statewide Transportation Plan 23 CFR 450.214 & 49 CFR 613

Under ISTEA, each state must complete a statewide transportation plan which incorporates both the guidelines presented in ISTEA and the specific planning factors listed below. The state can produce either a project or policy level plan which must be completed and signed by the Governor by January 1, 1995 and cover a period of at least twenty years. It must be submitted to the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) for approval.

The statewide plan must incorporate transportation planning carried out by all state agencies and significant transportation related actions carried out by other agencies for recreation, tourism, and economic development. The regulations do not establish a time for revision of the plan but do require that, "[it] be continually evaluated and periodically updated as appropriate, using the same established procedures."

The statewide plan must consider the plans of the Massachusetts Metropolitan Planning Organizations (MPOs) and appropriate surrounding state's MPOs, that were completed in October 1993. Further, it must synthesize elements of the existing Statewide Transportation Improvement Program. The regulations for both of these planning requirements are described later in this section.

The plan must be *intermodal*, as defined in 450.214.b.1., giving consideration and provision to connections between rail, commercial motor vehicle, waterway, and aviation facilities, particularly with respect to intercity travel and the efficient movement of people and goods. All policies must consider as their ultimate goal the maintenance and creation of links to foster an intermodal transportation system.

The intermodal orientation of the Plan will foster projects that improve air quality by creating better transportation connections and thus reducing automobile congestion. The reduction in growth of Vehicle Miles Traveled (VMT) is mandated by the Clean Air Acts (described later) and is now considered the goal of any transportation planning process.

Regional Transportation Plans 23 CFR 450.322

Under ISTEA, each designated Metropolitan Planning Organization (MPO) must complete a regional transportation plan which incorporates both the guidelines presented in ISTEA and the specific planning factors listed below. Each regional transportation plan is endorsed by the Secretary of Transportation, with a similar process as the statewide transportation plan. All regional plans must be submitted to the Federal Highway Administration (FHWA) and to the Federal Transit Administration (FTA) for approval. Regional plans must be updated every 3 years in air quality non-attainment areas (which is the entire Commonwealth) and every 5 years in attainment areas, the most recent updates of regional plans were completed in October 1993. Plans may also be updated intermittently at the discretion of the MPO.

The Metropolitan Planning Organization is a body designated by the Governor and the local governments to act as a forum in each region for cooperative decision making. Its primary purpose is to carry out the continuing, comprehensive, and cooperative (called 3C) transportation planning process first set out in the Federal-Aid Highway Act of 1962.

The policies and projects contained in the regional plans are the basis for the Transportation Improvement Programs which are described later in this section.

Specific Factors for Statewide and Regional Transportation Plans

ISTEA requires that each state and their MPOs create transportation plans that include strategies and actions that lead to the development of an intermodal transportation system. The planning efforts of each state and region must include consideration of the factors summarized on the next page from the Federal Statewide and Metropolitan Planning Regulations (23 CFR 450.214, 23 CFR 450.322).

Statewide Factors

1. Overall social, economic, energy and environmental effects
2. Effects on land use
3. Preservation of rights of way for future transportation projects
4. Access to border crossings, ports, airports, recreation areas
5. Public involvement in the transportation planning process
6. Innovative finance methods

7. Federal, state and local energy use goals
8. State water pollution plans
9. Air quality impacts
10. Methods to expand and enhance transit ridership
11. Strategies for incorporating bicycle and pedestrian facilities
12. Transportation needs in non-metropolitan areas
13. Metropolitan transportation plans
14. Connectivity of metropolitan areas
15. Recreation travel and tourism
16. Management systems for pavement, bridges, safety, congestion, intermodal facilities and public transportation
17. Bicycle transportation facilities and pedestrian walkways
18. International border crossings
19. Major freight distribution areas
20. Military installations
21. Needs of Native American Tribal Lands

Regional Factors

1. Preservation and efficient use of existing facilities
2. Consistency with federal, state, and local energy conservation efforts
3. Relief from and prevention of congestion
4. Effects of decisions on land-use
5. Programming of transportation enhancement activities
6. Effects of projects within metropolitan area, without regard to funding source
7. Border crossings and access to ports, airports, intermodal facilities, etc.
8. Connectivity of roads within metropolitan areas with roads outside area
9. Transportation needs identified through the use of Management Systems
10. Preservation of rights-of-way
11. Methods to enhance the efficient movement of freight
12. Use of life cycle costs in the design and engineering of bridges tunnels and pavement
13. The overall social, economic, energy, and environmental effects
14. Methods to expand and enhance transit services and increase the use of those services
15. Capital investments that result in increased security in transit system

Statewide Transportation Improvement Program (STIP) 23 CFR 450.216

Transportation Improvement Program (TIP) 23 CFR 450.324

The Statewide Transportation Improvement Program (STIP) is a list of transportation projects, either in progress or being planned, based on Transportation Improvement Programs (TIP) created by each of the federally designated Metropolitan Planning Organizations (MPOs). Massachusetts has chosen to submit its STIP annually to FHWA and FTA. The role of the STIP is to assure that transportation planning for the state and its regions is being done in a fiscally constrained manner, in conjunction with requirements pertaining to disadvantaged business enterprises (DBEs) and The

American with Disabilities Act regulations (described later in this section), with emphasis on meeting air-quality conformity requirements.

As indicated, each MPO is required to create a Transportation Improvement Program (TIP) which is a staged three-year program of capital improvements to an MPO's transportation system. The TIP is subject to approval by the MPO and the Governor and must assure air quality conformity. Once completed it is compiled with other regional TIPs to form the STIP. The capital improvement projects in the TIP must be consistent with the policies formulated in the statewide and regional transportation plans.

The STIP/TIP must:

1. Contain projects that are consistent with the statewide transportation plan
2. Be fiscally constrained
3. Conform in non-attainment and maintenance areas
4. Contain all capital and non-capital transportation projects
5. Contain all regionally significant projects requiring actions by FHWA and FTA

Each project must be listed separately with the following information:

1. Estimated project cost
2. Amount of Federal funds proposed to be obligated during each program year
3. First year proposed category of Federal funds and sources of non-Federal funds
4. Second and third year likely category or possible categories of Federal and non-Federal funds
5. Identification of agencies responsible for carrying out the project

Unified Planning Work Program 23 CFR 450.314

Each MPO, in cooperation with the state and public transit operators, shall develop a regional Unified Planning Work Program (UPWP) which summarizes the mutual responsibilities of those entities carrying out the transportation planning process. The UPWP serves as the scope of work for transportation planning contracts between Federal and state transportation agencies and individual MPOs.

ISTEA MANAGEMENT AND MONITORING SYSTEMS (FHWA 23 CFR Parts 500 and 62; FTA 49 CFR Part 614)

ISTEA mandates that each state, in cooperation with its MPOs, develop and implement seven management and monitoring systems. The outgrowth of these systems will be the development of project- and strategy-specific alternatives for addressing various transportation needs which must be considered in the development of metropolitan and statewide transportation plans and improvement programs.

A work plan for system implementation is required to be completed by October 1, 1994. A work plan is defined as a written description of major activities necessary to develop, establish,

and implement a management or monitoring system, including identification of responsibilities, resources, and target dates for completion of major activities. Six management systems, as well as a traffic monitoring system to support management systems data needs, are required for:

- Pavement Management System (PMS)
- Bridge Management System (BMS)
- Safety Management System (SMS)
- Congestion Management System (CMS)
- Public Transportation Facilities and Equipment Management System (PTMS)
- Intermodal Transportation Facilities and Systems Management System (IMS)
- Traffic Monitoring System for Highways (TMS/H)

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) 42 U.S.C. 4321

The National Environmental Policy Act requires Federal agencies to include in their decision-making processes appropriate and careful consideration of all environmental effects of proposed actions. This includes providing the public with planning and project alternatives that seek to avoid and minimize adverse effects of proposed actions, and restore and enhance environmental quality as much as possible.

MASSACHUSETTS ENVIRONMENTAL POLICY ACT (MEPA) M. G. L. c. 30, ss. 61-2H

The Massachusetts Environmental Policy Act requires all agencies of the Commonwealth to determine the impact on the natural environment of all works, projects, or activities conducted by them. Further, these agencies must use all practicable means and measures to avoid or minimize any environmental harm that has been identified. MEPA requires the submission of an Environmental Impact Report (EIR) through which this obligation is satisfied and authorizes the Secretary of Environmental Affairs to oversee the MEPA review process. MEPA regulations apply to projects directly undertaken by state agencies and to private projects for which state permits are sought or in which state funding or land transfer are involved.

MEPA requires the state to evaluate and openly discuss the potentially harmful environmental impacts of proposed projects in advance so that decision makers can make informed choices about whether and under what conditions projects with potentially adverse impacts should proceed. It also requires that alternatives be considered. MEPA is not a permitting process. The MEPA review process happens before or in the early stages of permitting to ensure that the permitting agencies have the basic information they need to determine if a project is consistent with regulatory requirements. This entire process is public and ensures that citizens are fully informed.

THE CLEAN AIR ACT AMENDMENTS OF 1990 (CAAA) 42 U.S.C. 7401-7626

When Congress passed the Clean Air Act Amendments of 1990 it established a major new goal for the country's transportation system. These amendments went beyond the original Clean Air Act to force states to develop ongoing air quality analysis tools. Transportation programs now

have to actively attain and maintain established National Ambient Air Quality Standards (NAAQS), developed by the federal Environmental Protection Agency. NAAQS set allowable concentrations and exposure limits for various pollutants including ozone, carbon monoxide and small particulate matter.

The Act requires projects selected for construction to prove their ability to improve air quality. This legislation (building upon previous Clean Air Act Amendments) may be the single most important step towards rethinking statewide transportation planning.

The CAAA provides for greater integration of air quality analysis in the transportation planning process. This ensures that transportation plans, programs and projects conform with established State (Air Quality) Implementation Plans (SIP's), described below, and contribute to attainment of the NAAQS. The primary means of achieving conformity is to seek reduction in VMT and congestion levels, which are major mobile contributors to poor air-quality.

In essence, the CAAA is among the most powerful transportation planning laws in use, as no regionally significant project can be built unless it is proven not to be detrimental to air quality. The act does not provide for the significant funding needed to carry out the required programs and projects but, coupled with the ISTEA legislation, transportation planners now have the ability and the incentive to marshal appropriate resources to mitigate air quality problems.

The CAAA seeks to integrate transportation and air quality planning through the State Implementation Plan, which is an ongoing compilation of state strategies for meeting air-quality conformity requirements. Specifically Title I of the CAAA requires that all transportation plans, programs, and projects conform with the SIP for attainment of the National Ambient Air Quality Standards. The strategies listed in the SIP, which address particular pollutants such as ozone and carbon monoxide, are meant to assist regions with meeting and maintaining air-quality standards.

FEDERAL COASTAL ZONE MANAGEMENT ACTS/AMENDMENTS

16 U.S.C. 1451 et seq

43 U.S.C., 1241

The Coastal Zone Management Act of 1972 (CZMA) and its 1976 Amendments provide coastal states with the opportunity and funding to develop comprehensive management programs to review all proposed projects and actions that may effect coastal zones, regardless of their funding sources, for consistency with state coastal policies. This allows The Executive Office of Environmental Protection and its Coastal Zone Management Unit, to review all transportation projects within the established Massachusetts Coastal Zone. In addition, projects outside of the coastal zone with impacts that may effect the zone are also subject to review.

THE ENERGY POLICY ACT OF 1992 42 U.S.C 13201

The Energy Policy Act of 1992 sets a national goal of reducing transportation's dependence on oil by 30% by 2020. This legislation emphasizes research and usage of alternate sources and fuels including, electricity, natural gas, methanol, ethanol, propane, hydrogen and others. The goal of the Energy Policy Act of 1992 is to:

"...slow the Nation's increasing dependence on imported oil over the short-term, and in the long term significantly reduce that dependence; reduce the consumption of oil in the transportation sector, and encourage the development and deployment of renewable energy resources."

This legislation has not had as dramatic an effect on transportation planning as ISTEA or the Clean Air Acts because its primary focus is on specific types of fuels used. It can however, encourage the population to use alternative fuels by requiring federal and state fleets and the fleets of energy providers to convert, in part, to alternative fuels. Beginning in 1996, 25% of all federal fleet purchases in urban areas must be for alternatively fueled vehicles, by 1999 75% of fleet purchases must be alternatively fueled vehicles. The Commonwealth has an Alternative Fuels Committee which is successfully working to implement these guidelines.

THE MASSACHUSETTS ENERGY PLAN OF 1993

The Massachusetts Energy Plan of 1993 is intended to serve as a blueprint for future state government actions and to provide a guide for the Commonwealth's energy community and consumers. It details actions and strategies that state agencies and private entities can take to promote energy efficiency. The goal of the Massachusetts Energy Plan is to create a balance between economic development and environmental compatibility. Using tenants of the aforementioned Clean Air Act Amendments and the National Energy Policy Act as a basis, the Massachusetts Energy plan sets out state goals and strategies for improving energy efficiency by proposing the implementation of energy and cost saving innovations. The Plan is divided into seven focus areas and key actions including:

1. Increasing overall energy efficiency
2. Improving utility regulation
3. Implementing least-cost strategies
4. Diversifying energy resources
5. Establishing public/private partnerships for innovations in business and technology
6. Promoting efficiency and diversity in transportation energy use
7. Mobilizing the State Energy Education Initiative

THE AMERICANS WITH DISABILITIES ACT OF 1990

42 U.S.C. 12101-12213

47 U.S.C. 225 & 661

The landmark legislation Americans with Disabilities Act (ADA) of 1990, provides comprehensive civil rights protection to individuals with disabilities in the areas of employment, public accommodations, State and local government services, and telecommunications. The stated purpose of the legislation is to:

1. Provide a clear and comprehensive national mandate for elimination of discrimination against individuals with disabilities.
2. Provide clear, strong, consistent, and enforceable standards addressing discrimination against individuals with disabilities.
3. Ensure that the Federal Government plays a central role in enforcing the standards established in the Act on behalf of individuals with disabilities.
4. Invoke Congressional authority...to address the major areas of discrimination faced day-to-day by people with disabilities.

The above policies effect the delivery of transportation services in a variety of ways. Federal regulations 49 CFR Part 37, titled Transportation Services for People with Disabilities outlines state and local roles in making services fully accessible. In addition, the Massachusetts Architectural Access Board has created accessibility design regulations currently employed in the design and restoration of all public facilities.

NATIONAL TRANSPORTATION SYSTEM INITIATIVE (NTS)

Federal Register Vol. 59, No.120, June 23, 1994

In 1993 the federal Department of Transportation designated 159,000-mile of national highway as the National Highway System. Building on the foundation of the National Highway System and based on the declaration of policy contained in ISTEA, the next step will be to develop a full National Transportation System which will encompass all modes of transportation including those yet to be developed. It is intended that all these modes be interconnected to promote factors that are important to the nation, these include clean air and reduced energy consumption which result in safe, comfortable, efficient and cost- effective transportation.

The National Transportation System initiative is still in the draft stages. State and regional transportation and planning agencies await federal guidelines on selecting facilities for the NTS. When these guidelines are received the Commonwealth of Massachusetts and its regions will work closely with the federal Department of Transportation to assure that we include all appropriate facilities in the new National Transportation System.

CHAPTER 7

THE MASSACHUSETTS TRANSPORTATION PLANNING PROCESS

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) brought a new era of transportation planning to Massachusetts and the nation. Although a formal transportation planning process has been in existence in Massachusetts for decades, ISTEA presents a wealth of opportunities and challenges for the transportation community in the 1990's and beyond. It does this by encouraging multimodal planning, infrastructure preservation, congestion management systems, environmental enhancements, and by requiring that all transportation planning promote the attainment of national air quality planning goals under the federal Clean Air Act Amendments. In terms of regional and statewide transportation planning, the transportation planning process in Massachusetts under ISTEA is evolving and dynamic within a relatively fixed matrix of state and federal regulatory requirements.

As far back as 1962, legislation was enacted so that highway planning would be the product of comprehensive planning for entire urban areas. The early planning efforts were also intended to be flexible enough to take changing conditions into account and to encourage grass-roots input from local communities. In fact, since the mid-1960's, the U.S. Department of Transportation would not approve any highway or transit projects in an urbanized area of more than 50,000 people unless such projects were developed by means of a **continuing, comprehensive** transportation planning process carried on **cooperatively** by the states and local communities. This regional transportation planning process became known as the "3C Process".

HOW HAS ISTEA CHANGED THE PLANNING PROCESS?

Federal transportation rules and policies have continued to strengthen and evolve the transportation planning process, culminating with ISTEA. In October 1993, the U.S. DOT published final rules under ISTEA for metropolitan planning and statewide planning (see 23 CFR 450, 49 CFR 613; Federal Register, October 29, 1993). ISTEA and the rules created to implement all of its requirements have strengthened the traditional 3C planning process in several significant ways by:

1. Requiring a statewide planning process and expanding the planning requirements at the regional level;
2. Providing flexibility for the funding of transportation projects, thus allowing the funding of infrastructure requirements based on needs and priority;
3. Giving increased emphasis to the consideration of all modes of transportation;
4. Requiring Management Systems for Pavement, Bridges, Highway Safety, Traffic Congestion, Public Transportation Facilities and Equipment, and Intermodal Transportation Facilities and Systems.
5. Requiring regional plans and state and regional transportation improvement programs to be financially constrained with infrastructure improvements based upon a reasonable expectation of funds that will be available for implementation.

The 1993 rules not only clarify the meaning of the "3C"s, but also describe in great detail the factors and relationships which must be considered and evaluated by **Metropolitan Planning Organizations (MPOs)** at each step throughout the transportation planning effort, including system performance, strategies, the planning process, public participation, and implementation.

The Meaning of 3C

The *comprehensive* aspect of the 3C planning process means that transportation planning must consider all modes of transportation, support regional growth and development plans and link transportation plans and programs with land use, economic, social and environmental concerns.

The *cooperative* aspect of the 3C planning process refers to the interactive relationship between local and regional needs and federal and state policies, and working together to ensure these needs are met.

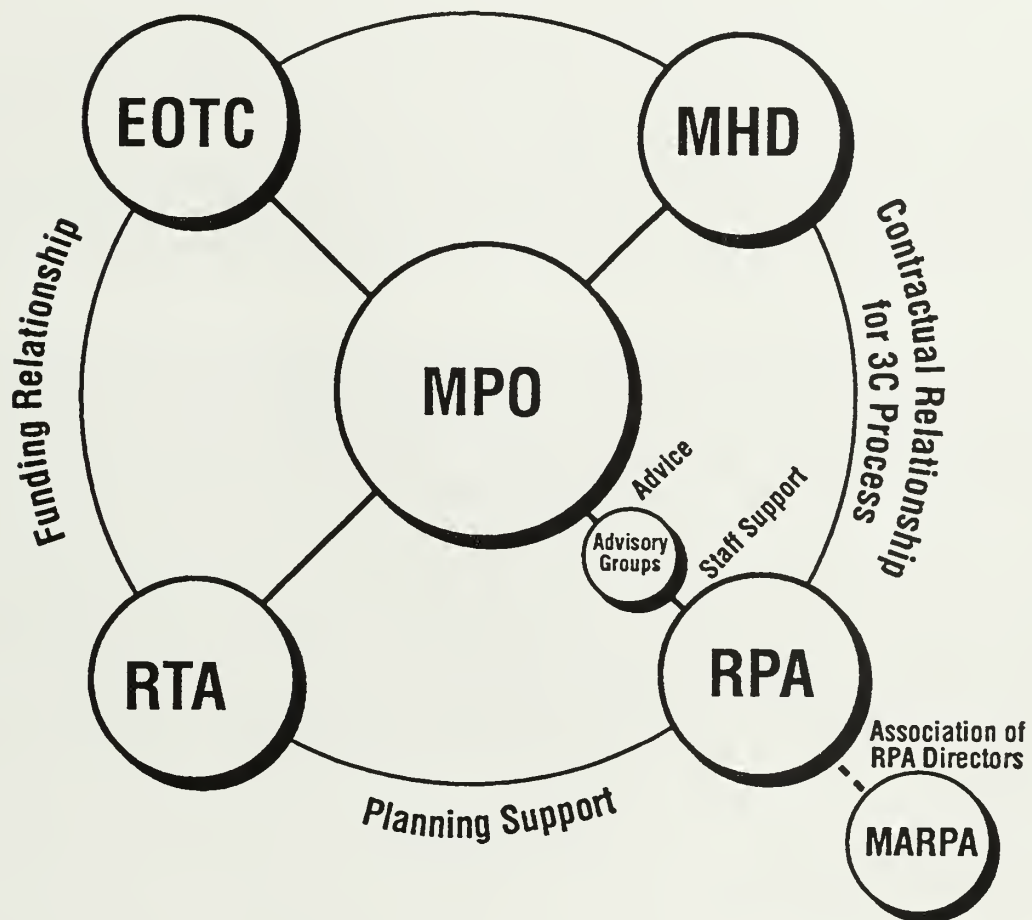
The *continuing* aspect of "3C Planning" means that transportation planning is an ongoing process which is viewed as dynamic in nature, and necessitating continual review and revision in order to meet changing needs and goals.

METROPOLITAN PLANNING ORGANIZATIONS (MPO'S)

Transportation planning, under the 1993 rules, is the responsibility of the Metropolitan Planning Organization (MPO) for a particular area. MPOs are designated by the Governor in areas having urban populations over 50,000. Massachusetts currently has 10 MPOs across the state. In Massachusetts, the geographic boundaries of the MPO's coincide with the planning jurisdictions of the **Regional Planning Agencies (RPA's)**. Massachusetts has thirteen RPA's; the ten MPOs and three other similarly structured organizations in the non-metropolitan areas of the state (Franklin County, Martha's Vineyard, and Nantucket); providing comprehensive transportation planning coverage for the entire Commonwealth.

The MPO as structured in Massachusetts typically consists of representatives of four member organizations: the Executive Office of Transportation & Construction, the Massachusetts Highway Department, the Regional Planning Agency, and the Regional Transit Authority. The Boston region has a slightly different configuration in that, in addition to the two state transportation agencies and the regional planning agency for the Boston metropolitan area, the Boston MPO also includes the Massachusetts Port Authority, the Massachusetts Bay Transit Authority (MBTA) and the MBTA Advisory Group. A list of the Regional Transportation Agencies (i.e. the Regional Planning Agencies and the Regional Transit Authorities) is included in **Appendix A**. The jurisdiction of the Regional Planning Agencies is shown in **Appendix B**. The organizational structure typically found in MPO's throughout the state is shown in **Figure 7-1**.

Figure 7-1



All of the MPOs were created to undertake comprehensive, cooperative and continuing transportation planning for their respective regions and to develop a prioritized program of projects. This program of transportation projects and statement of regional priorities, referred to as the **Transportation Improvement Program**, or TIP, is required to be developed within a framework which includes full and active public participation in an ongoing process. The TIP, updated annually, is one of several major outputs or decision-making tools of the 3C Transportation Planning Process, each of which is described later in this section.

Statewide Transportation Agencies in MPO's

The Executive Office of Transportation and Construction (EOTC) is the cabinet-level agency that establishes transportation policy throughout the Commonwealth. EOTC dictates comprehensive transportation policy and guidance to a number of state agencies, either directly or indirectly, including the Massachusetts Highway Department, the Massachusetts Aeronautics Commission, the Massachusetts Bay Transportation Authority, the Massachusetts Port Authority and the Massachusetts Turnpike Authority. EOTC is the state agency responsible for transit programs and, as Chair of each MPO, it plays a central and comprehensive role in defining and supporting transportation policy, planning and programming.

The Massachusetts Highway Department (MHD) has primary responsibility for highways and bridges throughout the Commonwealth. Because MHD receives all Federal Highway Administration (FHWA) funds for metropolitan planning, it also plays a central role as a clearinghouse in the 3C Planning process. MHD enters into contractual agreements with each of the RPA's in Massachusetts to provide support funding for each MPO's transportation program.

Bureau of Transportation Planning and Development, a division of MHD, reports to the Executive Office of Transportation and Construction for policy direction. It has the responsibility for developing statewide comprehensive plans and programs and provides a direct link to the regional planning agencies. The Bureau administers all Federally-aided 3C transportation planning contracts for both highway and transit planning, and provides for technical support and coordination of statewide planning activities with the MPOs, Federal Highway Administration, and Federal Transit Administration.

Regional Agencies in MPO's

Regional Planning Agencies. As MPO members, the regional planning agency (RPA) plays the most active role in the 3C Planning Process. The RPA acts as the lead planning agency within the region and is responsible for all modes of transportation planning in addition to its non-transportation planning functions. The RPA also conducts analyses of projected air emissions associated with the proposed transportation improvement program within its region to determine if its proposed program of transportation projects conforms to the standards of the federal Clean Air Act. In addition, because the RPA is a comprehensive planning body, it assures that transportation planning and resultant programs are fully coordinated with other functional planning programs such as land use and environmental planning. Finally, the RPA often acts as an extension of the state transportation agency staff, working closely on matters of common concern.

Regional Transit Authorities. Another key member of the MPO is the Regional Transit Authority (RTA). The role of the RTA is to provide technical review, support and advice in matters of transit planning. State legislation authorizes cities and towns to join together to form Transit Authorities to operate local bus service. Other transit authorities, such as the MBTA, may operate light, heavy, or commuter rail, or other surface transit facilities. Each community determines the level of service within the community to be provided by the Transit Authority, and, the net cost of services of the transit authority is assessed upon member communities in proportion to the net cost of service within the community. In addition to the Commonwealth's assistance to the transit authorities, the Federal Transit Administration (FTA) provides substantial funding for capital and operational expenses. The RTA also serves as a funding source to the RPA's for transit planning assistance. The RTA's and the RPA's often enjoy close working relationships.

Planning in Non-Metropolitan Areas

Massachusetts treats the non-metropolitan areas of the state in similar fashion to the metropolitan areas. The same MPO structure is employed and is similarly formalized in a Memorandum of Understanding approved by all parties.

PRODUCTS OF THE 3C TRANSPORTATION PLANNING PROCESS

As a result of the changes that ISTEA has required to the 3C planning process, the three major products formerly required -- the Unified Planning Work Program, the Transportation Plan and the Transportation Improvement Program -- now includes a fourth product -- Major Investment Analyses. Each of these products, along with any required changes, are described below.

Unified Planning Work Program

The regional transportation planning process is carried out within the framework of a work program. A document, referred to as the Unified Planning Work Program (UPWP), is the primary means for coordinating modal planning activities and for integrating them into comprehensive intermodal planning efforts. Within each region, the UPWP identifies and describes all regional transportation and related planning activities to be undertaken by the MPO during the ensuing twelve month period. This document details responsibilities, budgets, and time schedules which serve as a basis for funding the various transportation planning activities of the MPO.

Transportation Plan

Each Unified Planning Work Program includes a task description for development of a Regional Transportation Plan (RTP). The RTP is a long range vision for the region that identifies transportation facilities needed for an integrated and intermodal transportation system over a 20-year period. The RTP must include a component which details a financial strategy for implementation of Plan recommendations and each RTP must be fully coordinated with Federal and State requirements under the Clean Air Act.

Transportation Improvement Program

The key product of the transportation planning process within each region is the Transportation Improvement Program, which is a three-year program of projects developed by and for each MPO annually. It prioritizes transportation projects for funding and is a prerequisite for Federal-aid project approval. Projects listed in the Transportation Improvement Program are derived from the Regional Transportation Plan. In addition, the U.S. EPA's Air Quality Conformity Regulations require that the TIP demonstrate conformity with the Clean Air Act Amendments of 1990. All TIP's must also be developed in accordance with the requirements of the Americans with Disabilities Act.

Major Investment Analyses

Metropolitan Planning rules require that for projects of sufficient size and/or scope, a Major Investment Analyses be undertaken to provide for a thoughtful and thorough evaluation of alternative actions, social/environmental impacts and cost effectiveness. Under the regulations, a **Major Investment** is defined as a "high-type highway or transit improvement of substantial cost that is expected to have a significant effect on capacity, traffic flow, level of service, or mode share at the transportation corridor or sub-area scale". Major Investment Analyses are part of a continuing effort by the Federal government to assess and evaluate the effectiveness of transportation plans and projects, including the broad planning assumptions which provide the framework for the transportation issues, public choices and future decisions within a region.

PUBLIC PARTICIPATION IN THE PLANNING PROCESS

Public participation in the transportation planning process in Massachusetts centers on the well-established processes of the 10 Metropolitan Planning Organizations (MPO). Each MPO has a historically publicly accessible transportation advisory group which provides policy guidance to the MPO on transportation issues, plans and projects. The public involvement processes in each of the regions have been further enhanced by the latest rules relating to ISTEA. Under ISTEA, the public input and participation process within each region has been formalized by means of a public participation plan that has been developed and made available for public review. The intent of instituting a public participation plan is to provide an outreach effort aimed at bringing a greater diversity of participants into the process.

MPO Transportation Advisory Groups

Each MPO has a transportation advisory group which advises the MPO on matters of transportation policy and the MPO process. The transportation advisory group advises the member agencies on the acceptability of transportation related documents required by the state and federal government. However, these advisory groups perform their most important function through exposure of the public to the planning process. A pro-active public process is essential to proper 3C transportation planning and, as such, the transportation advisory group interacts with the activities of the regional planning agency as it fulfills its mandate in developing the transportation plans and programs for the region.

State

The Commonwealth also has undertaken a public participation process integrated into the development of this Statewide Intermodal Transportation Plan (**Accessing the Future**) and the State Transportation Improvement Program. This public participation and input process has been proactive and state-wide in scope, and built upon the public participation process of the MPOs. It is considered a logical and effective strategy to solicit, incorporate and respond to public input because it derives from the role the state transportation agencies play in the Metropolitan Planning Organizations. Chapter 8 details the Commonwealth's public participation activities in the development of **Accessing the Future**.

CERTIFICATION OF THE TRANSPORTATION PLANNING PROCESS

In order to access the Federal funds available to the state, Federal-aid projects must be the product of a certified planning process. The Federal government requires that a certification of the process be undertaken annually. This certification takes into account much of what has been discussed above: the transportation planning process must be comprehensive in nature, meaning that it is required to take into account land use considerations and the inter-connectivity with other modes; it must result from an open and proactive public involvement process; it must conform to the requirements of the Clean Air Act; it must utilize financial constraint in the development of its plans and programs; it must allow for major investment analyses in order to consider the full range of alternatives, environmental and social impacts and cost-effectiveness. Finally, the 3C Planning process is required to utilize specific management systems described under the Federal planning rules.

CHAPTER 8

PUBLIC PARTICIPATION FOR ACCESSING THE FUTURE

(A summary of the public participation process employed in the development of this plan will appear in the final version of the document.)

Accessing the Future

Part Three: Issues to Consider

Chapter 9: Management Systems

Chapter 10: Financing Mechanisms

Chapter 11: Environmental Issues

CHAPTER 9

MANAGEMENT SYSTEMS

ISTEA provides federal funding authorizations for highways, highway safety, and transit through federal fiscal-year 1997. ISTEA contains a mixture of new and continuing programs, and represents a significant shift in federal transportation policy. The stated objective of ISTEA is "the improved performance of statewide and metropolitan transportation systems through preservation, operational, and capacity improvements." One of the most important features of ISTEA is the flexibility it gives State and local officials in choosing among highway, transit, and other transportation alternatives. This flexibility helps State and local officials choose projects without the influence of strict Federal funding categories or different matching ratios which favor one mode over another.

The downward shift of transportation decision-making responsibilities is accompanied by new planning responsibilities for the state and local governments. ISTEA requires that states and Metropolitan Planning Organizations (MPO's) carry out a comprehensive transportation planning process in order to coordinate the best mix of transportation projects.

To ensure that the planning process allocates resources in the most effective and efficient manner, ISTEA mandates that each state, in cooperation with MPOs, develop and implement six management systems as well as a traffic monitoring system to support management systems data needs.

DEFINITION OF MANAGEMENT SYSTEMS

According to the Management and Monitoring Systems Interim Final Rules (FHWA 23 CFR Parts 500 and 62; FTA 49 CFR Part 614; December 1, 1993), a management system is defined to be

"...a systematic process, designed to assist decision makers in selecting cost-effective strategies/actions to improve the efficiency and safety of, and protect the investment in, the nation's infrastructure. A management system includes: (1) identification of performance measures; (2) data collection and analysis; (3) determination of needs; (4) evaluation and selection of appropriate strategies/actions to address the needs; and (5) evaluation of the effectiveness of the implemented strategies/actions."

Seven systems are required:

1. **Pavement Management System (PMS):** A systematic process that provides, analyzes, and summarizes pavement information for use in selecting and implementing cost-effective pavement construction, rehabilitation, and maintenance programs for all Federal-aid highways.
2. **Bridge Management System (BMS):** A decision support tool that supplies analyses and summaries of data, uses mathematical models to make predictions and recommendations, and provides the means by which alternative policies and programs may be efficiently considered for all bridges, both on and off Federal-aid highways.
3. **Safety Management System (SMS):** A systematic process that has the goal of

reducing the number and severity of traffic crashes on all public roads by providing information for selecting and implementing effective safety strategies and projects to ensure that all opportunities to improve highway safety are identified, considered, and implemented in all phases of highway planning, design, construction, maintenance, and operation. The SMS shall incorporate roadway, human, and vehicle safety elements.

4. **Congestion Management System (CMS):** A systematic process that provides information on transportation system performance and alternative strategies to alleviate congestion and enhance the mobility of people and goods. Strategies to be considered include TDM measures, HOV facilities and programs, public transportation capital and operating improvements, congestion pricing, growth management strategies, incident management, IVHS technology, and, as a last resort, additional general purpose capacity.
5. **Public Transportation Facilities and Equipment Management System (PTMS):** A systematic process that collects and analyzes information on the condition and cost of transit assets, e.g., maintenance facilities, stations, terminals, transit-related structures, equipment, and rolling stock, on a continuing basis in order to provide cost-effective strategies for providing and maintaining assets in serviceable condition. The PTMS shall cover all public and private transit operators receiving Federal Transit Act Sections 3, 9, 16, or 18.
6. **Intermodal Transportation Facilities and Systems Management System (IMS):** A systematic process to identify and manage intermodal facilities that serve the movement of people and goods (the key linkages between one or more modes of transportation, where the performance or use of one mode will affect another), and to define strategies for improving their effectiveness. Intermodal facilities include highway elements providing terminal access, coastal and inland ports and canals, pipeline farms, airports, marine and/or rail terminals, major truck terminals, intercity bus terminals, and major transit terminals.
7. **Traffic Monitoring System for Highways (TMS/H):** A systematic process for the collection, analysis, summary, and retention of highway-related person and vehicular traffic data, including public transportation on public highways. These data include traffic volume, vehicle classification, vehicle weight, and vehicle occupancy data associated with either a system of highways or a particular location, during a prescribed period of time.

Three of the six management systems — Pavement, Bridge, and Public Transportation Facilities — are "asset" management systems, i.e., they are designed to identify needs and develop actions in order to maintain and improve facilities and equipment, such as roads, bridges, buses, and transit stations. The other three management systems — Safety, Congestion, and Intermodal — are "performance" management systems, i.e., they are designed to identify needs and develop actions to improve the performance of the transportation system, that is, to increase safety, reduce congestion, enhance mobility, and improve connectivity.

LINKAGE TO THE PLANNING PROCESS

The result of the management systems are intended to be project- and strategy-specific alternatives for addressing needs. According to the rules,

"the results (e.g., policies, programs, projects, etc.) of the management systems shall be considered in the development of metropolitan and statewide transportation plans and improvement programs and in making project selection decisions"

Figure 9-1, taken from the rules, represents an approach for integrating, or linking, the management systems and planning processes. In effect, the role of the management systems is both to develop information and strategies to improve the performance of existing and future facilities, and to provide input to the planning process for consideration at the system level.

SCHEDULE FOR COMPLIANCE AND POSSIBLE SANCTIONS

States must begin implementing the management systems beginning in Federal fiscal year 1995 (October 1, 1994 to September 30, 1995) according to the schedule shown in Figure 9-2. Note that while there are varying final implementation dates, the first product for each system — a work plan for system implementation — is required to be completed by October 1, 1994. A work plan is defined to be a written description of major activities necessary to develop, establish, and implement a management or monitoring system, including identification of responsibilities, resources, and target dates for completion of major activities.

The state must certify annually to the U.S. Secretary of Transportation that they are implementing each of the management systems; certification statements must be submitted to the FHWA Division Administrator by January 1 of each year beginning January 1, 1995. The Governor shall notify the FHWA Division Administrator in writing by September 30, 1994 of the title(s) of the certifying official(s) for each system.

Beginning January 1, 1995, **if a state fails to certify annually as required, or if the Federal agencies determine that any management system is not being adequately implemented, the U.S. Secretary of Transportation may withhold up to ten percent of the Federal transportation funds apportioned to the state.** Sanctions may be imposed on a statewide basis, on a subarea of the state, for specific funding categories or projects, or for specific fund recipients depending on the adequacy of implementation of the management systems.

COORDINATION, IMPLEMENTATION AND OPERATION

According to the federal rule, the roles and responsibilities of the state, MPOs, transit funds recipients, and other agencies involved in the development, establishment, and implementation of the management systems shall be mutually determined by the parties involved. The rules specify that the state shall have the following procedures in place for coordination, establishment, implementation, and operation of the management systems:

Figure 9-1
LINKAGE BETWEEN THE
ISTEA MANAGEMENT SYSTEMS
AND THE PLANNING PROCESS

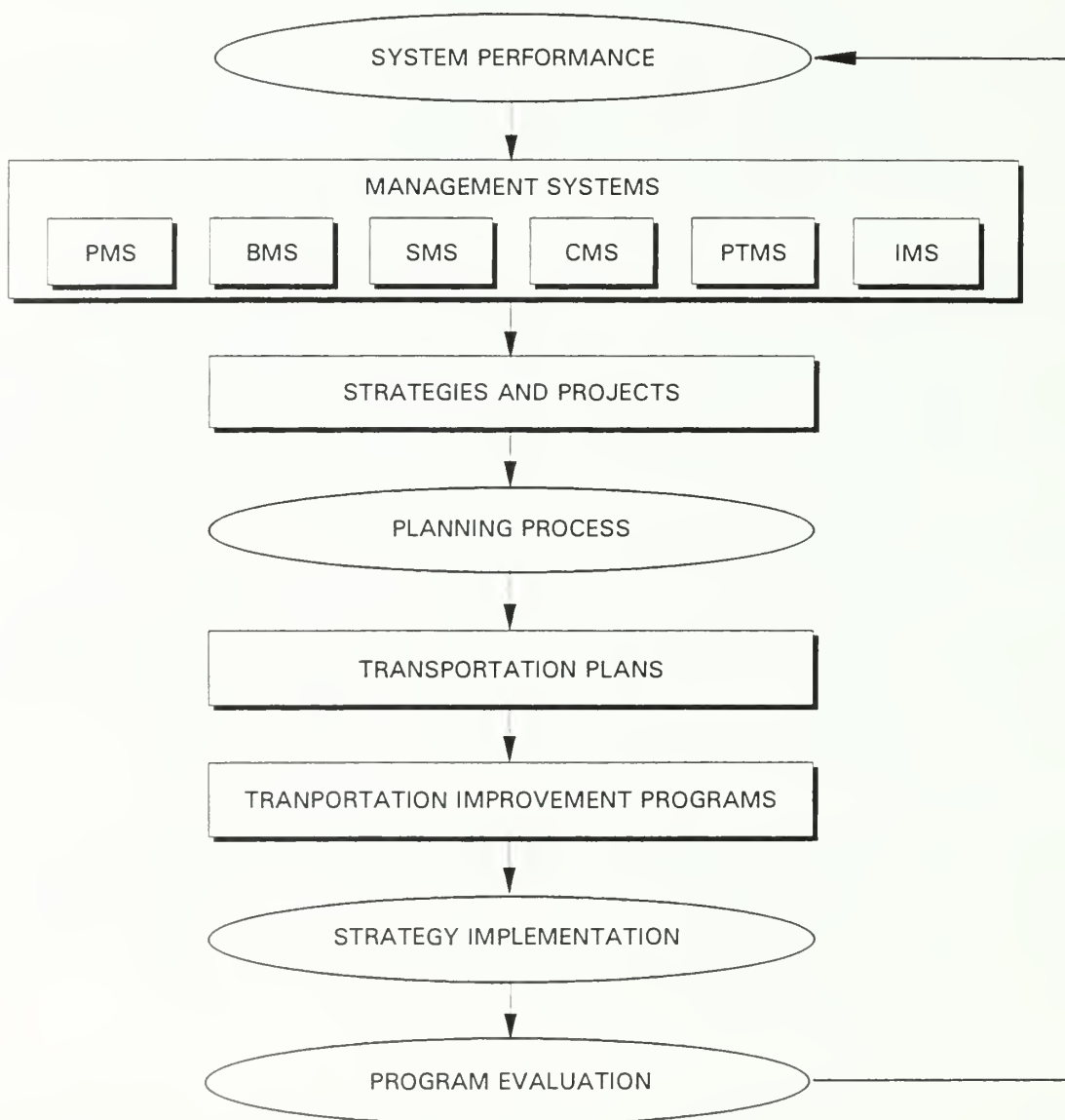


Figure 9-2**Interim Final Management System Implementation Dates**

PAVEMENT	Work plan completed.	10/1/94
	Full operation on NHS	10/1/95
	Full operation on non-NHS Federal-aid highways . .	10/1/97
BRIDGE	Objectives and work plan completed	10/1/94
	System design completed and data collection underway	10/1/95
	Full operation	10/1/98
SAFETY	Work plan completed.	10/1/94
	System implementation completed or underway . . .	10/1/95
	Full operation	10/1/96
CONGESTION	Work plan completed and data collection underway .	10/1/94
	Full operation in non-attainment TMAs; data collection underway in other areas	10/1/95
	Full operation in all areas	10/1/96
PUBLIC TRANSP.	Work plan completed.	10/1/94
	Condition measures and data system structure established and data collection underway	10/1/95
	Full operation	10/1/96
INTERMODAL	Work plan completed; facilities inventory complete .	10/1/94
	Performance measures and standards established; system design complete; data collection underway . .	10/1/95
	Full operation	10/1/96
TRAFFIC	Work plan complete	10/1/94
	Full operation on NHS	10/1/95
	Full operation on all other public highways (except local or rural minor collectors)	10/1/96

1. An oversight process to assure adequate resources are available for implementation and that the target dates are met.
2. Methods to ensure the use of common or coordinated reference systems and methods for data sharing.
3. A mechanism to address issues related to the purposes of more than one management system.
4. The state shall cooperate with MPOs in metropolitan areas, local officials in non-metropolitan areas, affected agencies receiving FTA assistance, and other agencies including private owners and operators, that have responsibility for operation of the affected transportation systems or facilities.

PROGRESS TO DATE

To respond to Management System requirements, the Massachusetts Executive Office of Transportation and Construction (EOTC) has developed a coordinated inter-agency organizational approach comprised of three components (See **Figure 9-3**):

Executive Steering Committee: This committee, composed of high-level representatives of various agencies, is responsible for policy direction, oversight, and resource allocation.

Technical Coordinating Committee (TCC): This committee reports to the Executive Steering Committee and serves to coordinate the efforts of organizations involved in development and implementation of the management systems through coordination of the seven technical groups.

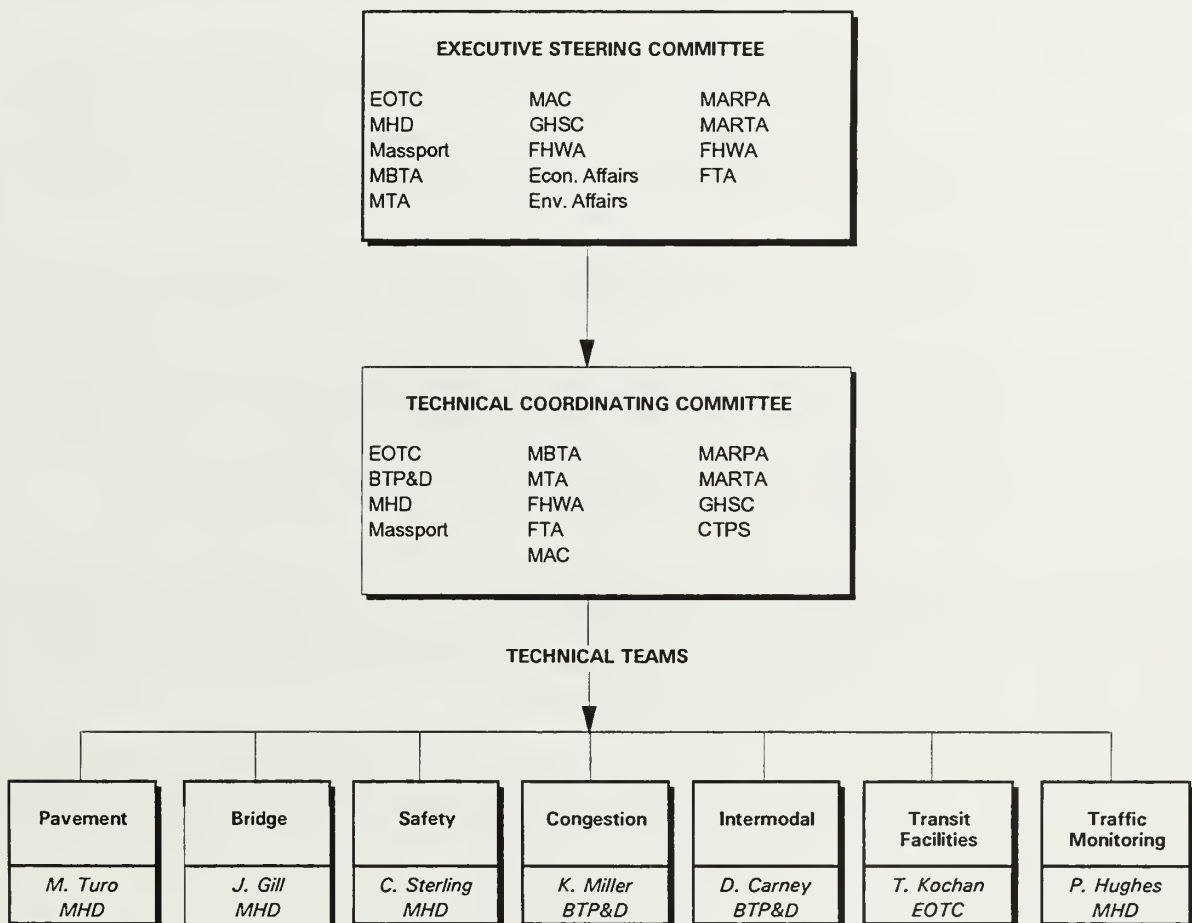
Management Systems Technical Teams: Seven technical teams — one for each management or monitoring system — report to the Technical Coordinating Committee. Each technical team has primary responsibility for developing and implementing its management system in coordination with the other technical teams.

Each of the three groups has met periodically from December, 1994 to the present. The groups will continue to meet through the initial implementation phase and until solutions to all system problems are in place.

As of October 1, draft work plans have been developed by each of the technical teams. A summary of each of the draft work plans follows **Figure 9-3**.

Figure 9-3

ORGANIZATION FOR MANAGEMENT SYSTEMS DEVELOPMENT



1. **Pavement Management System (PMS):** The Massachusetts Highway Department (MHD) and the 13 Regional Planning Agencies (RPA's) will work cooperatively to implement PMS on 10,900 Center Line Miles of federal aid highway in the Commonwealth.

The PMS will be an expanded version of the Pavement Management System already in place at MHD. As currently envisioned, RPA's that already have pavement management programs in place can use those preexisting systems. The strategies that have been identified are Reconstruction, Structural Overlay, Surface Treatment, Routine Maintenance and Do Nothing.

PMS will require Traffic Volume data and Weight data from the Traffic Monitoring system. PMS will provide refinements to the Road Inventory file with its Global Positioning System (GPS) and video logging equipment. All data collected will be referenced to a common geographic standard so that it can easily be used by other systems.

2. **Bridge Management System (BMS):** The MHD will be the lead agency and will work cooperatively with the Massachusetts Turnpike Authority (MTA), the Massachusetts Port Authority (MPA), the Massachusetts Bay Transportation Authority (MBTA), the Metropolitan District Commission, the Massachusetts Department of Natural Resources, the Massachusetts Department of Environmental Management and the Massachusetts Water Resources Authority to ensure that all 5,073 highway bridges in the Commonwealth can be included in the BMS.

MHD will use PONTIS, a bridge management system developed as part of a demonstration project sponsored by the Federal Highway Administration. Nearly all of the states will use PONTIS to fulfill the BMS requirements of ISTEA. MHD will design reports in consultation with the RPA's. The reports will be produced annually for the RPA's to use in the planning process.

BMS will require Traffic Volume data, Vehicle Classification Data and Vehicle Weight Data from the Traffic Monitoring System. All data collected will be referenced to a common geographic standard so that it can easily be used by other systems.

3. **Safety Management System (SMS):** The MHD will work cooperatively with State and local police, the Governor's Highway Safety Bureau, the Massachusetts Registry of Motor Vehicles and the Massachusetts Department of Public Health, Office of Emergency Medical Services to implement the Safety Management System.

The system will focus on Engineering, Enforcement, Education and Emergency Medical Services to reduce highway accidents. Review of the Massachusetts Accident Record System (MARS), by the FHWA and the National Highway Traffic Safety Administration, in April, 1994 revealed a need to improve the system. A consultant has been retained to examine MARS and design an improved interagency system.

SMS will require Traffic Volume data and possibly Vehicle Classification data from the Traffic Monitoring System to focus the efforts of SMS. Accident data will be referenced to a common geographic standard so that it can easily be used by other systems.

4. **Congestion Management System (CMS):** The CMS is being developed as a cooperative effort by EOTC, the MHD, the MBTA, the RPA's, the Regional Transit Authorities (RTA's) and CARAVAN. The CMS will be operated by the individual RPA's with technical support available from state agencies.

CMS will focus exclusively on intraregional roadway and transit corridors and facilities. All interregional corridors and facilities as well as intraregional freight corridors and facilities will be covered in IMS.

CMS will require traffic data from the Traffic Monitoring System and accident data from the Safety Management System. CMS will include links and nodes that are required by IMS. CMS will provide data to IMS. All data collected for CMS will be referenced to a common geographic standard so that it can easily be used by other systems.

5. **Public Transportation Facilities and Equipment Management System (PTMS):** The PTMS is being developed by EOTC in cooperation with the MBTA, the RPA's, the RTA's and private sector representatives. The PTMS will encompass all providers who have received funds from Federal Transit Act Sections 3, 9, 16, or 18.

The PTMS will include an inventory of assets, an assessment of the asset condition, a determination of the asset's remaining useful life, deterioration rates and replacement costs of the assets.

The PTMS will be developed in coordination with the CMS, IMS and BMS systems to allow for easy interchange of data.

6. **Intermodal Transportation Facilities and Systems Management System (IMS):** The IMS is being developed by EOTC in cooperation with the RPA's, MPA and Massachusetts Aeronautics Commission. The IMS technical team has also been advocating for the creation of a Freight Advisory Council, consisting of public and private sector representatives, who would advise on many issues including the IMS.

IMS will focus exclusively on strategies to move freight and interregional passengers faster and cheaper than is possible under the current transportation system. IMS will obtain much of its data from CMS and will also receive data from the Traffic Monitoring System, the BMS and the PTMS.

7. **Traffic Monitoring System for Highways (TMS/H):** MHD with assistance from the RPA's will be responsible for all aspects of field data collection, equipment testing and acquisition of data from other sources. The types of data to be acquired include: Continuous traffic volume data, 48-hour traffic volume data, vehicle

classification data, vehicle weight data, vehicle speed data and vehicle occupancy data.

The TMS/H will collect data in support of all other management systems using a common geographic standard to ensure that data can be easily accessed by other systems.

Each of the management systems will provide, at the least, a systematic identification of problems that need to be addressed and possible strategies for solving the problems. These strategies may take the form of proposed projects (For Example, PMS and BMS will identify projects) or they may suggest the need for corridor studies or other methods of examining the problem in greater detail.

All strategies that are outputs of the management systems will become inputs to the transportation planning process. Addressing the problems in a systematic way using management systems helps to ensure a more comprehensive planning process. The coordinated development of the systems means there will be greater access to the data that will be vital to making infrastructure investment decisions.

CHAPTER 10

FINANCING MECHANISMS

To accomplish the goals identified in **Accessing the Future**, the transportation agencies will be required to utilize limited financial resources in an efficient and innovative manner. This chapter discusses the current methods of transportation financing and presents some alternative approaches for consideration.

First, this chapter identifies the mechanisms which the agencies are authorized to use for planning, maintaining, and improving the transportation systems of the Commonwealth of Massachusetts. Secondly, the present sources of funds are examined, and the flow of these dollars through the transportation agencies is explained. Thirdly, the chapter attempts to outline fiscal roles and responsibilities, as well as the interagency coordination that is necessary to ensure responsible transportation programming. Fourthly, the financing methods used by other states are included. Finally, the financing options available to the state are identified.

TRANSPORTATION AGENCY EXPENSES

The Commonwealth of Massachusetts spent about \$2½ billion in 1993 for transportation. This spending included funds to maintain and improve the state's highways, bridges, mass transit systems, ports and airports throughout every city and town in the state. The majority of these funds were used by the state's major transportation agencies and authorities, as listed below.

Massachusetts Highway Department

The Massachusetts Highway Department (MHD) is responsible for the maintenance and upkeep of over 3,000 miles of highway, 2,900 bridges and 60,000 acres of roadside area throughout the Commonwealth. In addition, the MHD oversees the distribution of funds to all of the state's cities and towns for local transportation projects. In Fiscal Year (FY) 1993, the MHD spent over \$1.1 billion for transportation, of which approximately 63% was reimbursed by the federal government.

Massachusetts Bay Transportation Authority

On an average weekday, 587,000 passengers rely on the MBTA to get them where they are going. To provide this service, the Authority runs over 50 million miles of integrated, multi-modal service each year, including 8 subway lines and over 150 bus and trackless trolley lines. In addition, the MBTA manages or subsidizes 11 commuter rail lines, commuter boats and door-to-door paratransit service for persons with disabilities. In 1993, the MBTA spent approximately \$764 million on mass transit, servicing 130 cities and towns in Massachusetts.

Regional Transit Authorities

The state's 15 Regional Transit Authorities (RTAs), located throughout Massachusetts, served over 28 million riders in FY 1993 through fixed route bus service. RTA paratransit services, for persons who cannot travel on conventional busses and trains, were used by over 2.4 million riders. In 1993, the RTAs spent \$62 million to provide these services.

Massachusetts Turnpike Authority

The Massachusetts Turnpike Authority (MassPike) oversees the 135-mile Massachusetts Turnpike, which extends from the City of Boston to the western border of the state, plus the Sumner and Callahan Tunnels under Boston Harbor which connect downtown Boston with Logan Airport. In FY 1993, MassPike spent \$156 million in order to operate and maintain this system.

Massachusetts Port Authority

The Massachusetts Port Authority (Massport) controls and operates Logan International Airport, Hanscom Field, all public marine terminals and piers in the Port of Boston, and the Tobin Memorial Bridge. Combined, Massport spent \$259 million in FY 1993 on these activities.

Massachusetts Aeronautics Commission

The Massachusetts Aeronautics Commission (MAC) oversees the development and operations at nearly 50 municipal and private, public-use airports, seaplane bases and heliports. It administers the airport improvement programs, safety inspections and enforcement, aircraft registration, and statewide airport and heliport planning. In FY 1993, MAC expended \$17.7 million on these activities.

Other Transportation Related Agencies

In addition to the agencies and authorities listed above, several other state agencies help to maintain and operate the state's transportation system. For instance, the Metropolitan District Commission (MDC) cares for 640 lane miles of roadway which connect MDC parks, the State Police are responsible for law enforcement and highway safety, and the Registry of Motor Vehicles (RMV) administers driver license and registration activities.

In addition, a good deal of roadway construction is performed by the cities and towns themselves. Most of this local road work is funded by the state, through either annual "cherry sheet" appropriations (Chapter 81) by the Legislature or through the state's Chapter 90 Program, administered by the MHD. In FY 1993, \$170.3 million was made available to the state's cities and towns for local road work; \$126.9 million through Chapter 90 and \$43.4 million through Chapter 81.

All of the agencies listed here work together to maintain and operate the Commonwealth's diverse and expansive transportation network. This chapter will provide a brief description of transportation

financing in Massachusetts, including where the money comes from and what it is spent on to keep the system running, and Massachusetts commuters moving.

FUNDING SOURCES AND MECHANISMS

The Massachusetts transportation network is financed through a variety of revenue sources, which may be broken down into three general categories: federal, state and direct income. These sources are briefly described below.

Federal Funding

Massachusetts received an estimated \$850 million in transportation funds from the federal government in 1993. The major sources of these funds, and the approximate percentage from each, were as follows:

Federal Highway Administration (FHWA)	84%
Federal Transit Administration (FTA)	12%
Federal Aviation Administration (FAA)	4%

Most of these funds are dispersed to the states through a complex legislative process of authorization and obligation, as described in the following sections.

Authorization and Apportionments

The first step in the federal funding process is authorization. The United States Congress authorizes funding for transportation projects through federal legislation. For highways and mass transportation, the most recent authorization was the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). This legislation authorized more than \$155 billion in funding nationwide over a 6-year period ending in FY 1997. Most of these funds are apportioned to the states on a needs-basis formula, which considers the state's population, road miles, vehicle miles, and air quality. Other funds are apportioned on a competitive grant basis, depending on the proposed transportation project's merit, as well as other variables.

Massachusetts is authorized to receive about \$5 billion over the 6-year life of ISTEA, in the 11 general categories listed in **Table 10-1**. Due in great part to the federal government's commitment to fund a major portion of the Central Artery/Tunnel (CA/T) Project in Boston, the Commonwealth's FY 1994 apportionment of \$1.05 billion ranks third among all of the states. In fact, of the \$5 billion total for Massachusetts, over \$2.4 billion has been authorized for the CA/T Project. If not for the project, the state would never have received these federal funds.

Appropriation Process and Obligation Authority

In order for a state to receive the federal funds authorized to it through legislation such as ISTEA, the U.S. Congress must also obligate the funds through the annual budget process. Each year

Congress sets an obligation limit, which caps the amount of contractual obligations in which the federal government will enter into during the upcoming fiscal year. For transportation, this obligational limit may be equal to or less than the total authorizations included in ISTEA - depending upon the overall budget approved by Congress. For instance, **Table 10-1** shows that although Massachusetts was apportioned about \$1.06 billion in FY 1994, the state received only about \$1.00 billion in obligation authority. Massachusetts was not allowed to access the remaining \$60 million due to the federal government's overall obligation cap. In fact, as of September 1993, Massachusetts had a total unobligated balance of \$798 million, the highest of any state in the nation. Whether or not the state will ever be able to access these funds is up to Congress.

Flexible Funding

ISTEA signified a new era in transportation financing by giving transportation leaders, at the state and local level, much more flexibility in deciding how federal highway and transit funds should be

Table 10-1
Massachusetts Estimated Apportionment of ISTEA Funds
(Based on FHWA Estimates, July 1993)

(\$ millions)

Funding Category	FY1992	FY1993	FY1994	FY1995	FY1996	FY1997
Interstate Completion (CA/T)	429	760	757	475	-	-
Interstate Maintenance	41	47	46	46	46	46
Bridge Program	96	119	120	120	120	120
Surface Transportation Program (STP)	7	5	5	5	183	183
Highway Planning and Research (HPR)	14	21	20	15	9	9
National Highway System (NHS)	52	62	62	62	62	62
Metropolitan Planning	3	4	4	4	4	4
Interstate Transfer	4	4	-	-	-	-
Congestion Mitigation & Air Quality (CMAQ)	33	40	40	40	40	40
Toll Reimbursement	-	-	-	-	100	100
Hold Harmless	13	0	0	0	183	175
Total Apportionment (Rounded)	629	1060	1060	780	750	740
Obligation Authority	687	877	1000	N/A.	N/A	N/A.

used to meet a state's individual transportation needs. By allowing states to use some ISTEA funds interchangeably, for highways, transit or intermodal purposes, regions can determine the appropriate mix of projects to most efficiently attain their transportation goals. For FYs 1993 and 1994, Massachusetts transferred about \$62 million in "traditional" highway funds to mass transit, and the state is programmed to transfer another \$40 million in FY 1995. Since mass transit improvements can actually decrease or eliminate the need for expanding highways, it makes sense for states to apply these transfers under the appropriate circumstances. In fact, Massachusetts is among the leaders of all the states in using the flexibility of ISTEA to transfer funds for transit use.

Redistribution of Unused Obligation

Through the annual appropriation process, the U.S. Congress distributes discretionary funds for transit projects, special funds for earmarked projects, and redistributes any unused obligation authority from the previous year. In other words, if a particular state does not spend all of its obligation authority, other states who have spent their entire authorization are allowed to spend it instead. Over the past few years, Massachusetts has been committed to spending 100% of available federal funds for transportation. As a result, the Commonwealth has received a "bonus" from FHWA for the past two fiscal years: \$54 million in FY 1993 and \$55 million in FY 1994 - the highest of any state in the nation.

In order to leverage all available federal funds (and become eligible for these bonuses), Massachusetts has developed a diverse statewide transportation program which maximizes funding in the proper amounts and categories. In addition, the state must come up with its share of project funding. Through ISTEA, the federal government reimburses the state for about 80% of most project costs (90% for Interstate Completion projects). However, Massachusetts must first commit to the entire project cost (prior to reimbursement) and then, after reimbursement from FHWA, the Commonwealth is left with its 20% state share.

Other Federal Funding

In addition to the flexible funds provided by ISTEA for transit purposes, the Federal Transit Administration (FTA) provides Massachusetts with federal funds for mass transportation. As with ISTEA funds, the allocation of most FTA funds to states and individual agencies (such as the MBTA) is based on two factors:

1. The yearly FTA budget, and
2. A statistical formula which considers a number of factors, including population, vehicle miles operated and route miles.

Other FTA funds are distributed at the discretion of FTA, on a project-by-project basis. The largest FTA programs include the following, which reference pertinent sections of federal legislation known as the Federal Transit Act.

- Section 3: Funding for the construction, or extension, of new transit service projects; modernization of existing rail systems; and major bus purchases and related facilities.

- Section 9: Capital and operating assistance to transit systems in urbanized areas.
- Section 16(b): For the provision of mass transit services for the elderly and disabled.
- Section 18: Capital and operating assistance to transit systems in rural areas.

In FY 1994, the MBTA spent about \$104 million in federal FTA funding: \$18 million in operating assistance and \$86 million for capital improvements. In addition, the state's RTAs received approximately \$7 million in federal aid for transit service.

Through the Federal Aviation Administration (FAA), the federal government also funds capital improvements at Massachusetts airports through its Airport Improvement Program (AIP). The AIP establishes funding for airports in four ways:

1. Federal grants to airports, based upon activity levels;
2. Various "set-asides" programs to direct more limited amounts to specific categories of airports and types of projects;
3. Discretionary accounts, based on FAA analysis of needs; and
4. The Passenger Facilities Charge (PFC) Program, where passengers at a particular airport are charged a fee which is to be earmarked for specific airport improvements. Although these are not federal funds, in the strictest sense, the FAA must approve the PFC and its use. In Massachusetts, only Logan Airport can charge passengers the PFC. This is further discussed later in the chapter.

Typically, FAA funding must be matched by both state and local funds, at a ratio of 90% federal, 7% state and 3% local. There are, however, exceptions to this rule based on the type of airport improvement project.

The Massachusetts Aeronautics Commission (MAC) received \$11.7 million in federal funds during FY 1993 for airport improvements across the state. Massport received approximately \$23 million for Logan Airport, in addition to funds generated through the PFC Program.

State Funding

In order to pay for the state share of Federally aided projects, and undertake other projects not eligible for federal funding, the Commonwealth spent an estimated \$920 million in state funds during FY 1993 for transportation purposes, not including funding for the State Police, Registry, and other "minor" agencies. State dollars for transportation come from a number of sources, including the gasoline tax, other motor fuels taxes, license and registration fees, and auto excise taxes. Most of these sources are known as direct user fee revenues, whereas the users of the transportation system (those who buy cars and gas and obtain licenses) are the ones paying for transportation improvements. A secondary source of state funds is indirect fees, including a portion of general income taxes or local property assessments.

As is the case in most states, the major source of user fee revenues for transportation in

Massachusetts is the gasoline tax. The Commonwealth started collecting a tax on gasoline in 1928. Since 1991, the tax has held at 21 cents per gallon, just slightly higher than the nationwide average of 18.6 cents. As **Figure 10-1** illustrates, 83.6% of gasoline tax revenues are distributed to the Highway Fund, 15.0% to the General Fund (for mass transportation), and 1.4% is distributed to a variety of Environmental Funds (related to water transportation). 15% of the gasoline tax, which is deposited into the Highway Fund, is mandated for local use in all 351 Massachusetts cities and towns. In addition to local uses, the Highway Fund also provides state funding for roadway and bridge projects across the Commonwealth, the State Police, the Registry of Motor Vehicles and 20% of the state share for some transit costs. It should be noted that no more than 10% of gas tax receipts in a fiscal year may be used for the Central Artery/Tunnel project. This ensures that the funds are used throughout the entire state.

Bond Proceeds

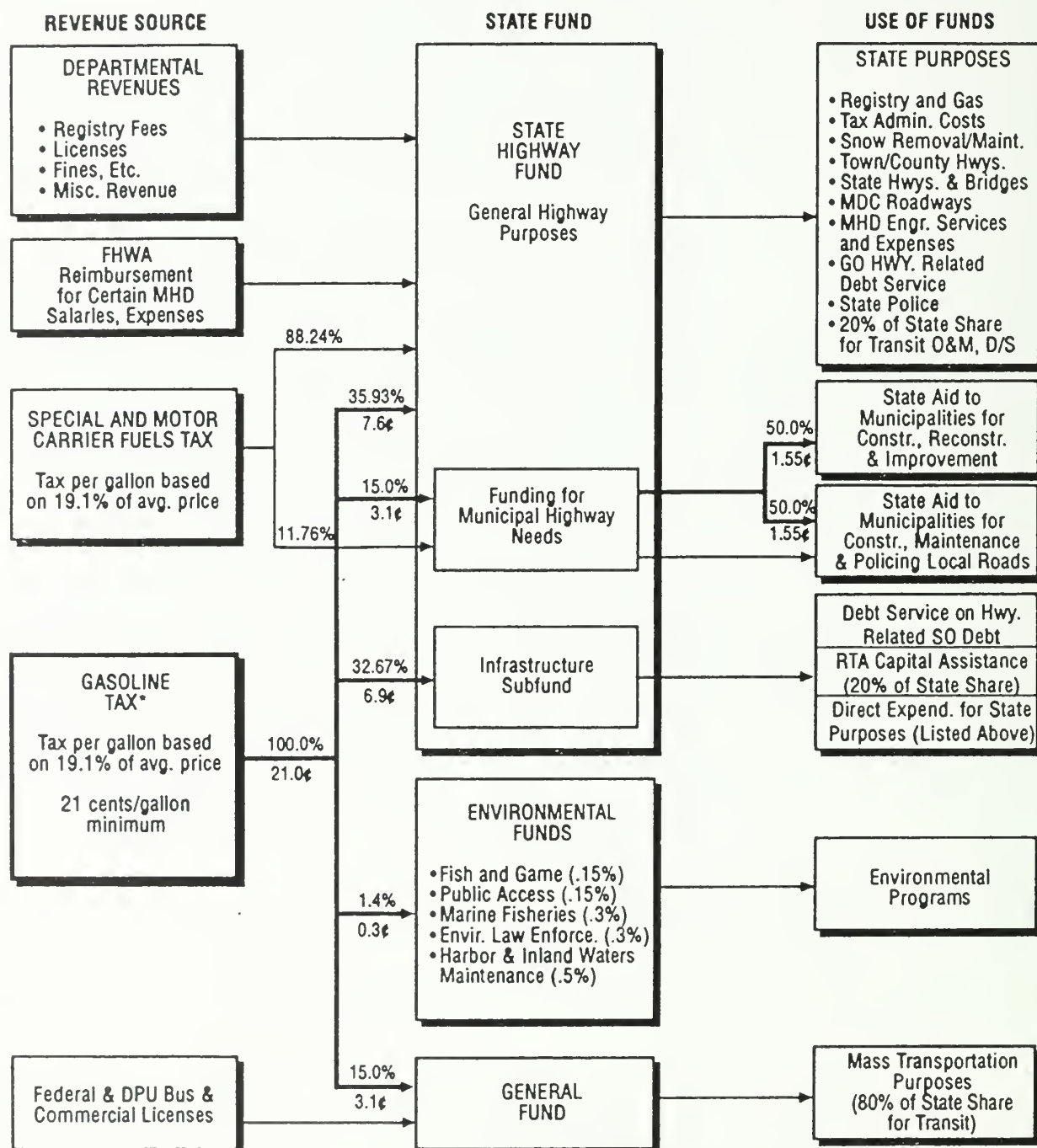
Massachusetts finances most of its capital improvement program, including transportation, through bond sales. Debt service on these loans is then paid off through both the General Fund and Highway Fund, both of which, in part, are financed from gas and other highway user fees. In this way, capital improvements are paid for over the length of time that taxpayers are receiving the benefits from them. Just as a homeowner takes out a 30-year mortgage to finance a house, the State pays for trucks (over 5 years) and bridges (over 20 years), depending on the projected life of the project or equipment. The majority of highway, transit and aeronautical projects, at both the state and local level, are funded in this way.

In order to borrow these funds, the Executive Office of Transportation and Construction (EOTC) must prepare a Transportation Bond Bill (TBB) about every 2 to 2½ years. The TBB outlines the programs and projects that transportation agencies would like to undertake in the upcoming years and lists the required funds, both state and federal, that will be needed for them. Once approved by the State Legislature and signed by the Governor, the agencies are authorized to borrow funds for transportation, subject to program and project limits set forth in the TBB. The 1994 Transportation Bond Bill is currently under review by the State Legislature. **Table 10-2** shows the distribution of bond authorizations, by agency, for the last two bond issues.

To generate the funds authorized in a TBB, the state issues either general obligation (GO) or special obligation (SO) bonds. GO bonds are backed by the general revenue of the state. SO bonds, for which the State Legislature created mechanisms in 1990, are backed by a dedicated revenue stream from the gasoline tax to the Infrastructure Subfund, which is part of the Highway Fund (**Figure 10-1**). In the past, the Commonwealth has used GO bonds as its primary bonding mechanism; however, the State Treasurer does have the option to issue SO bonds should interest rates and other conditions warrant it.

As independent authorities, Massport and Mass Pike have the legal authority to issue their own revenue bonds to finance capital improvements. There is no state backing or funds associated with these bonds since the authorities generate sufficient revenues, through tolls, fees and other income, to make all principal and interest payments. Because of their legal and financial independence, they are not subject to the same legislative and executive oversight as other state transportation agencies and authorities.

Table 10-1
Revenue Generated By the State of Massachusetts for Transportation



* No more than 10% of gas tax receipts in a FY may be used for the Central Artery/Third Harbor Tunnel Project, although unused funds in the subsequent FY.

Sources: MGL Ch. 29, S. 2(O) & 29(O); MGL Ch. 64A, 64E & 64F; MGL Ch. 81, S.31; MGL Ch. 90, S.34

The MBTA may sell bonds to finance capital projects. However, the bonds are backed by the Commonwealth with the debt service funded by the state through a combination of the Highway Fund, General Fund and Local Aid Fund and the local communities. 90% of the debt service costs are reimbursed by the Commonwealth, with the remaining 10% funded through local assessments on member communities as well as additional state assistance. The RTAs may not issue bonds independently; however they can be issued with the approval of the Secretary of Transportation. Instead, they typically "pre-fund" capital projects through short-term bond authorization notes (BANs) with local banks and are subsequently reimbursed by the state, usually within three years. RTAs receive their capital funds from both FTA and the Commonwealth. Unlike Massport and the Mass Pike, these authorities must rely heavily on the state to provide assistance both through the transportation bond issue and annual appropriations.

State Capital Spending Cap

In recent years, the Executive Branch has increasingly focused on consolidated capital expenditures, and debt, on a statewide basis. Particular attention has been paid to transportation, which makes up a large proportion of total state capital expenditures. The mechanism by which the Executive Branch controls statewide bonding levels is the Governor's Five Year Capital Plan, which lays out capital expenditure levels for the various state agencies. Under the Plan, each secretariat requiring capital expenditures (including EOTC) is assigned a maximum expenditure level, or cap, which is determined by the state's broader financial situation. The secretariat caps are based on expenditure levels requested by the secretariats, which are modified to fit within the financial framework deemed necessary to maintain a positive rating for the Commonwealth's bonds. Although the Executive Branch has allowed flexibility in expenditure levels between programs, overall expenditures must remain within the ceiling provided in the original plan. By bonding conservatively in recent years, Massachusetts has been able to preserve a favorable bond rating, making it less expensive to borrow money for capital improvements.

Table 10-2
Bond Authorization by Agency for the 1988 and 1991 Transportation
Bond Issues
(Numbers do not include federal funds)

(\$ millions)

	MHD	EOEA/MDC	EOTC	MAC	MBTA	Other	TOTAL
1988	\$633.4	\$41.8	\$49.0	\$6.1	\$1,480.6	\$0.9	\$2,211.8
1991	\$1,209.6	\$120.0	\$39.4	\$8.6	\$1,090.9	\$12.9	\$2,481.4

Annual Appropriations

State appropriations, through the operating budget, are made on an annual basis and are primarily for current year operating needs and debt service payments on previously issued bonds. Each year the State Legislature also has the option of providing an annual appropriation through the general operating budget to finance capital improvements on a "pay-as-you-go" basis, eliminating debt service by paying for projects with cash on hand rather than through a bond issuance. The amount of the appropriation, if any, depends on the available balance in the Highway Fund, and the balancing of the overall operating budget. FY 1993 was the only time in recent years where "pay-as-you-go" funds were made available for capital projects through the operating budget.

Direct Income

Some transportation authorities in Massachusetts also generate income internally, by charging users tolls or fees for using their services. For instance, in 1993 the MBTA generated \$153.5 million in revenue, primarily from transit fares. Massport, in FY 1993 collected about \$216.0 million and Mass Pike \$157.0 million. In the case of Massport and Mass Pike, these revenues covered all of the authorities' capital and operating costs. For the MBTA, direct income only accounted for 20.1% of operating costs.

FLOW OF STATE TRANSPORTATION FUNDS

This section describes the flow of dollars to and through the major transportation agencies of the Commonwealth; from revenue source, into various state funds, and ultimately to the appropriate agency for expenditure. Where considered helpful, the flow has been depicted graphically (**Figures 10-2 to 10-7**). It is worth noting that other state agencies such as the State Police, the Registry, and the MDC also receive funding for transportation-related purposes.

Massachusetts Highway Department

Financing highway projects in Massachusetts involves a complicated process of securing adequate funding from a number of sources, including those listed below. As **Figure 10-3** indicates, most of these revenues are then deposited into one of three primary funds: the Federal Highway Construction Program Fund, the Highway Fund or the General Fund, before they become available for expenditure.

1. **Federal Appropriations:** Since 1956, the federal government has used the Federal Highway Trust Fund (HTF) as a major source of federal transportation funding for the states. Like the Commonwealth, a primary source of revenue for the HTF is a tax on gasoline and other fuels. For instance, 18.4 cents per gallon of gasoline is currently collected and distributed by the federal government as follows:

Highway Trust Fund (for highway use)	10.0 cents
Highway Trust Fund (for mass transit)	1.5 cents
Leaking Underground Storage Tank Fund	0.1 cents
General Fund (for deficit reduction)	<u>6.8 cents</u>
Total	<u>18.4 cents</u>

Massachusetts has been quite fortunate over the years in receiving more federal transportation funds than it has provided to the HTF. For instance, in 1992, Massachusetts paid \$293 million into the fund and received \$699 million in return. In fact, since 1956, the State is actually about \$2.3 billion ahead.

2. State Gasoline Tax: Approximately \$495 million was raised through the 21 cent per gallon state gasoline tax in 1992. Of this, approximately \$413 million was deposited into the Highway Fund. The rest was applied to various environmental funds or to the General Fund, for mass transportation.
3. Other State Highway User Fees: In addition to the gasoline tax, automobile registration fees, drivers license fees and a tax on special fuels are also collected and applied to the state's transportation needs. These fees totalled about \$383 million in 1992.
4. Other State Taxes and Revenues: Through the General Fund, other revenues such as bus licenses, vehicle excise taxes and even a portion of the state income tax can contribute to highway financing.

Table 10-3 breaks down all MHD capital expenditures for FY 1993 by source (federal or state) and use. Of the \$1.008 billion spent on the FY 1993 capital program, over 70% came from the federal government. In addition, the MHD spent \$114 million during FY 1993 on operating expenses, funded almost exclusively with state funds.

Table 10-3
Massachusetts Highway Department Capital Expenditures
State Fiscal Year 1993

(\$ millions)

Category	Federal Expenditures	State Expenditures	Total Expenditures
FA Interstate	\$507.91	\$51.61	\$559.52
FA Non-Interstate	\$195.23	\$55.42	\$250.65
NFA Highways and Bridges *	\$0.00	\$138.48	\$138.48
Local Aid	\$0.00	\$41.48	\$41.48
Environmental	\$0.00	\$3.39	\$3.39
Planning & Research	\$8.08	\$1.06	\$9.14
Maintenance Sites & Equipment	\$0.00	\$2.54	\$2.54
Other	\$0.00	\$2.76	\$2.76
TOTAL	\$711.22	\$296.74	\$1,007.96

*This includes \$ 77.10 million "Pay As You Go" Funds. These are not bond funds.

Federal Aid; NFA=Non-Federal Aid

This table does not include MHD operating expenses.

Massachusetts Bay Transportation Authority

The MBTA also generates its funding from a number of sources, as described below and shown graphically in **Figure 10-4**.

1. MBTA Direct Income: The MBTA generates its own income from a number of activities, including the following:
 - fares collected for its rapid transit, commuter rail and bus services;
 - parking fees collected at transit and commuter rail parking lots;
 - revenues from advertising that is placed in subway stations, subway cars, busses and trolleys;
 - concession rents from newspaper stands and push carts at stations;
 - rents collected for the use of other MBTA properties; and
 - leasing rights to install fiber optics communication lines within MBTA rights of way.

As would be expected, passenger fares generate about 90% of the MBTA's direct income, which totalled \$153.5 million in 1993. Parking contributes approximately 4%, and all other sources less than 2% each.

2. Local Assessments: Seventy-eight cities and towns in the MBTA District are assessed a share of the MBTA's expenses for providing mass transit services to them. The assessment charged to each community is based on a complex formula which includes the type of service the community is provided, population, and boarding counts. In simple terms, the formula is designed to spread the costs of public transit among the communities based on the direct and indirect benefits they receive.

The communities' share of MBTA costs has decreased dramatically over the years. Prior to 1973, the cities and towns were required to pay for the MBTA's entire Net Cost of Service (total expenses less total revenues). In an effort to relieve some of the local financial burden, the Commonwealth began contributing to a portion of the cost in 1973 and, in 1974, the federal government began to provide annual operating subsidies for mass transit. In 1980, Proposition 2½ capped the growth in the municipal assessments at 2.5% annually - regardless of the MBTA's actual needs for the year. Lowering property values over the past few years have also hampered the local communities' ability to maintain their share of the cost of operating the MBTA.

3. Federal Funding: In 1993, the MBTA expended \$92.2 M in federal FTA funding: \$18.2 million in operating funds and \$74.0 million in capital funds, as follows:

Fed. Funding Source	Operating Assistance (in millions)	Capital Assistance (in millions)	Totals (in millions)
Section 3	\$ 0.0	\$35.0	\$35.0
Section 9	\$18.2	\$37.0	\$55.2
Section 23	<u>\$ 0.0</u>	<u>\$ 2.0</u>	<u>\$ 2.0</u>
Totals	<u>\$18.2</u>	<u>\$74.0</u>	<u>\$92.2</u>

In addition, the MBTA received \$32.2 million in federal funding through ISTEA transfers during FY 1993. It should be noted that, although operating assistance has remained fairly constant over the past several years, capital assistance is subject to considerable change, especially in terms of discretionary grants for particular transit projects and funding transfers from ISTEA.

4. State Funding: The Commonwealth provides the MBTA with two mechanisms for financial assistance. One way is by covering the Authority's annual operating deficit (which includes debt service payments). The second way is by including MBTA capital projects in a transportation bond issue, which allows the MBTA to pay for capital costs with bond proceeds. In 1993, the state provided the MBTA with \$469.8 million in operating assistance, which included \$165.5 million for debt service. Both of these forms of assistance are generated from a combination of the General, Local

Aid and Highway Funds.

Over the past decade, the state share of the MBTA's operating deficit has grown dramatically. As **Figure 10-2** shows, between 1983 and 1993 annual state assistance increased from \$159.7 million (42.1%) to \$469.8 million (61.5% of the MBTA's operating costs). The reasons for this are numerous, as discussed above. Although MBTA revenues have increased steadily over the past decade, they have not been able to keep up with operating costs. In combination with a decrease in federal assistance and capped growth for local assessments, the state has been forced to pick up the growing tab.

Regional Transit Authorities

The RTA financing process is similar in many ways to that of the MBTA. Their revenue sources include federal aid (through the FTA and ISTEA transfers); state assistance (through transportation bond issues and annual appropriations); local assessments from member communities; and direct income from ridership fares, advertising and rents.

In FY 1994, RTAs received approximately \$7 million in federal aid, \$42 million in state assistance, and \$10 million from a combination of local assessments and direct income. Of the \$42 million in state assistance, the majority of it (approximately \$31 million) was for operating costs and \$11 million was for capital costs.

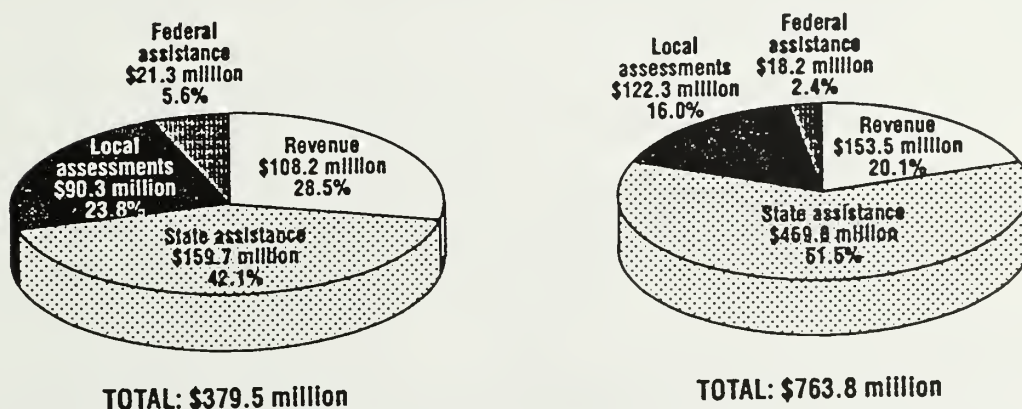
Massachusetts Aeronautics Commission

The majority of public use airports in the Commonwealth are overseen by the Massachusetts Aeronautics Commission (MAC). The only exceptions are Logan and Hanscom Airports, which are controlled and managed by Massport. The MAC collects aviation-related taxes and fees and directs them to the state's General Fund. The annual amount collected is approximately equal to the operating budget for the MAC, about \$0.6 million per year. However, the MAC cannot access any of these funds without legislative authorization and appropriation.

The state provides the MAC with the majority of its operating dollars through annual appropriations. Some capital projects are also funded in this way. In recent years, approximately 77% of the state's annual appropriation to the MAC has been for operating costs and 23% for the state's share of capital costs. Most capital projects are funded by a combination of federal, state and local funds (typically at a 90%-7%-3% ratio). Other projects not eligible for federal FAA funding are financed entirely with state and local funds (typically at a 70%-30% ratio). The majority of the MAC's share of capital costs comes from state transportation bonds.

In FY 1993, the MAC expended about \$17.7 million, which included \$0.6 million for operating costs and \$17.1 million for capital projects. Of this, approximately \$11.7 million, or 66%, was funded by the federal government. **Figure 10-5** illustrates the structure of funding sources for the MAC.

Figure 10-2
Funding Comparison of MBTA Operating Costs, 1983 and 1993



Massachusetts Port Authority

As an independent authority, Massport receives no state funding of any kind. In order to operate, maintain and improve its facilities, the Authority relies primarily on its own direct income, although Logan Airport is eligible for some federal funding through FAA (see Figure 10-6). Since revenues from most all operations are consolidated, unprofitable facilities (such as the Tobin Bridge) can be subsidized by more profitable operations, to some degree.

1. **Direct Income:** Massport generates most all of its own revenue from services and facilities it controls and operates. For FY 1993, this included the following activities, with net revenues for each calculated per Massport's Trust Agreement:

<u>Income Source</u>	<u>Amount (in millions)</u>	<u>Percent</u>
Airport Properties	\$172.0	79.5%
Port Properties	\$ 28.4	13.1%
Investment Income	\$ 10.7	4.9%
Tobin Bridge	\$ 5.2	2.4%
Other	\$ 0.1	0.1%
Total Net Revenues	<u>\$216.4</u>	<u>100.0%</u>

The revenues generated include tolls from the Tobin Bridge, aircraft landing fees, and parking fees at Logan Airport, as well as rental income from Massport properties and fees collected from concessions.

2. **Federal Funding:** Massport also received about \$23 million in FY 1993 from the federal government in the form of construction grants through the FAA's Airport Improvement Program (AIP). It should be noted that this \$23 million figure is more than Massport typically receives; which is generally in the area of \$10-16 million per year.

Massport also benefits from the FAA's Passenger Facility Charge (PFC) Program. Since November 1993, a \$3.00 PFC has been imposed on every Logan Airport passenger. Between 1993 and 2011, this PFC is expected to generate \$599 million for Logan Airport improvements, including the \$1-1.5 billion Logan Airport Modernization Program.

Massachusetts Turnpike Authority

In 1952, the Turnpike Authority was created by the Massachusetts Legislature as a financially self-supporting entity. As a result, for over 40 years, the Authority has never received any state or federal tax money. All of Mass Pike's revenue, used to design, construct, operate and maintain the Massachusetts Turnpike, is generated internally from tolls and facility-related charges and rents (see Figure 10-7).

The distribution of direct income generated by the Mass Pike in 1993 is shown below. Turnpike and Tunnel toll revenues are separated here because the two facilities are operated as separate cost and revenue centers. Each is governed by separate legislation and an individual Trust Agreement, which is a contract with bondholders which specifies how and where the revenues can be spent. The Authority also issues revenue bonds to fund some of its capital projects. The debt service on these bonds is funded directly from Mass Pike income.

<u>Source of Income</u>	<u>Amount (in millions)</u>	<u>Percent</u>
Mass. Turnpike Tolls	\$129.8	83.4%
Sumner/Callahan Tunnel Tolls	\$ 16.1	10.3%
Rental Income	\$ 4.0	2.6%
Restaurant/Concessions	\$ 2.4	1.6%
Service Stations	\$ 2.4	1.5%
Investment Income/Other	<u>\$ 0.9</u>	<u>0.6%</u>
Total Revenues	<u>\$155.7</u>	<u>100.0%</u>

Figure 10-3. Massachusetts Highway Department

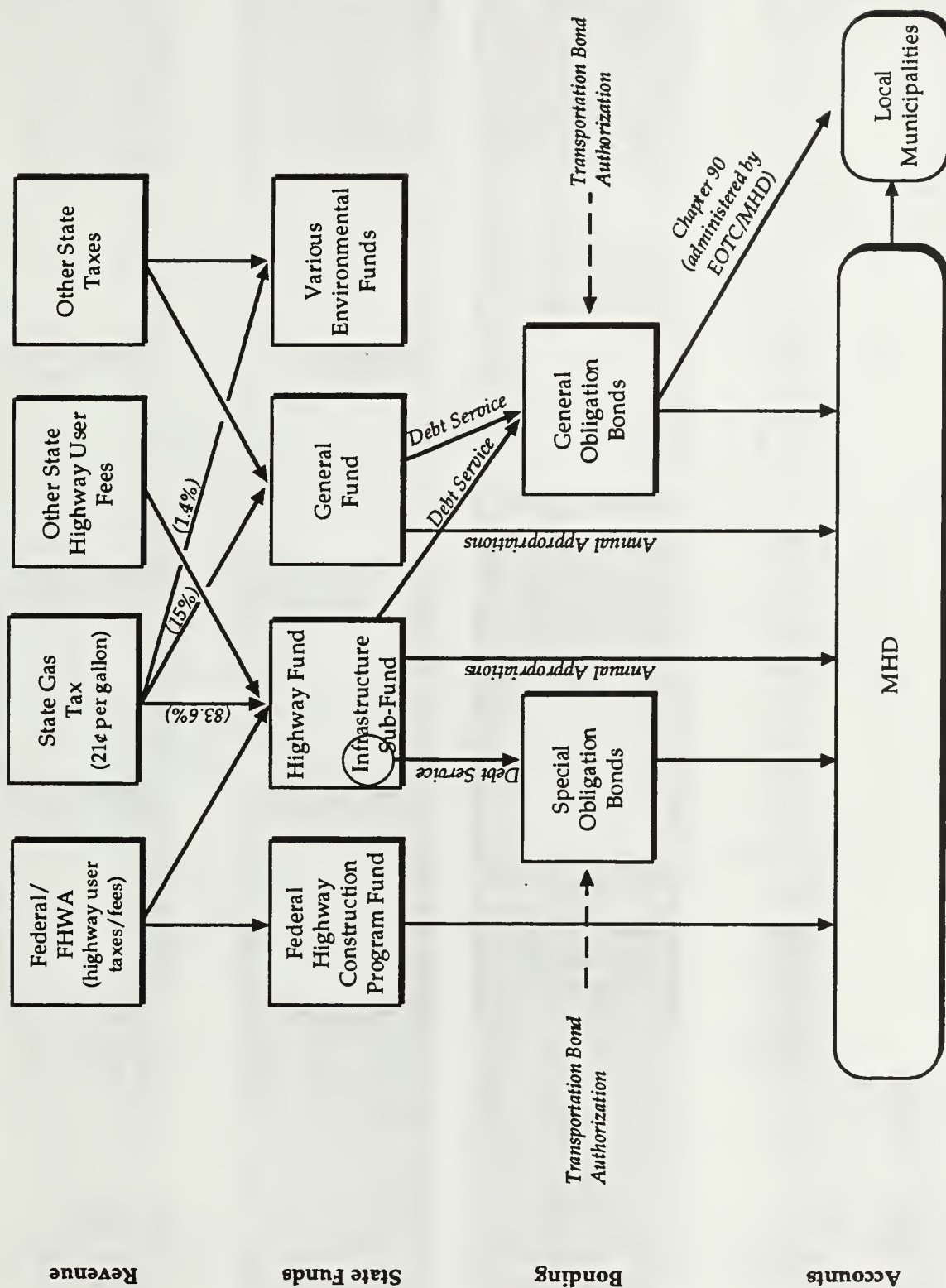


Figure 10-4. Massachusetts Bay Transportation Authority

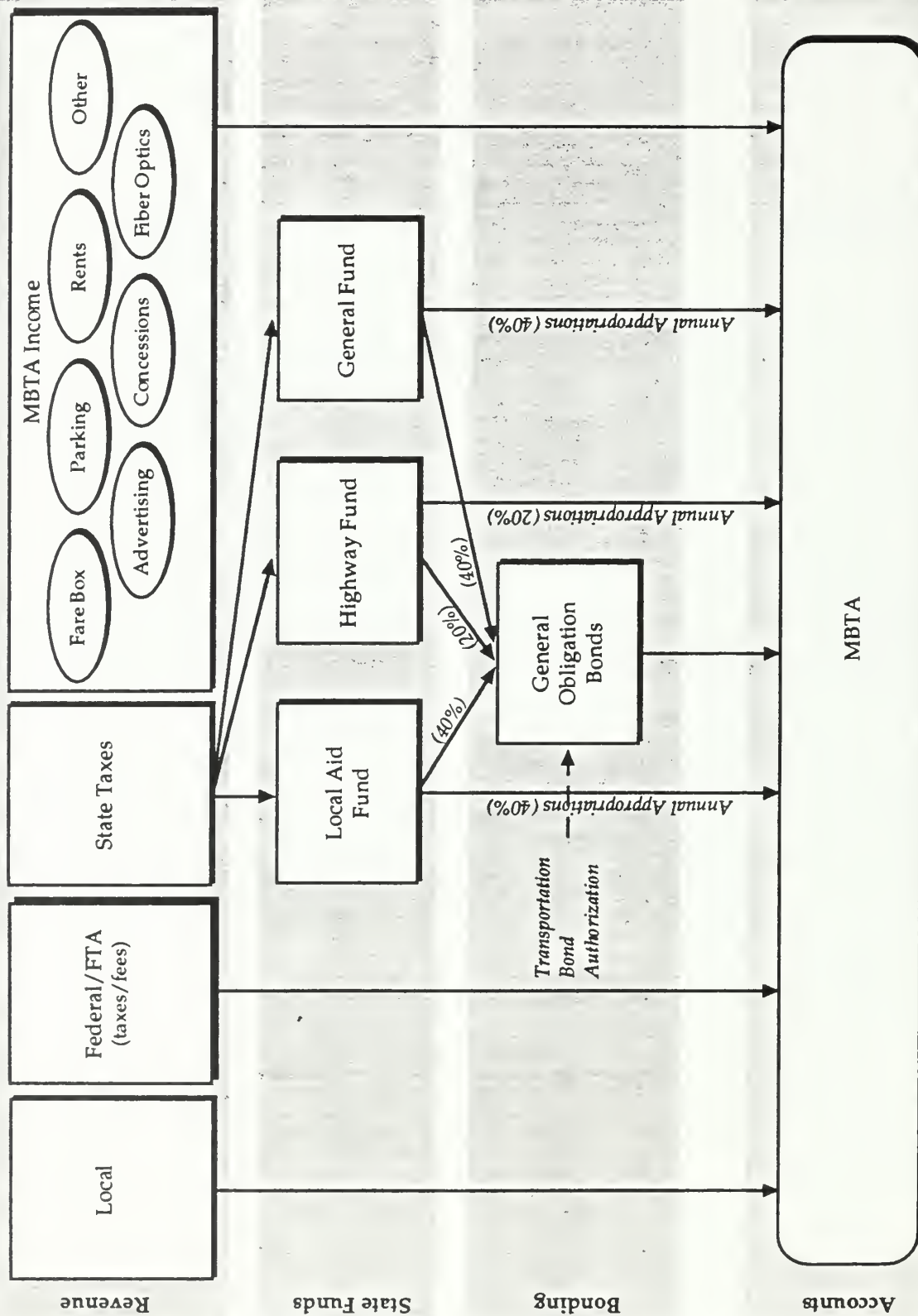


Exhibit 10-5. Massachusetts Aeronautics Commission

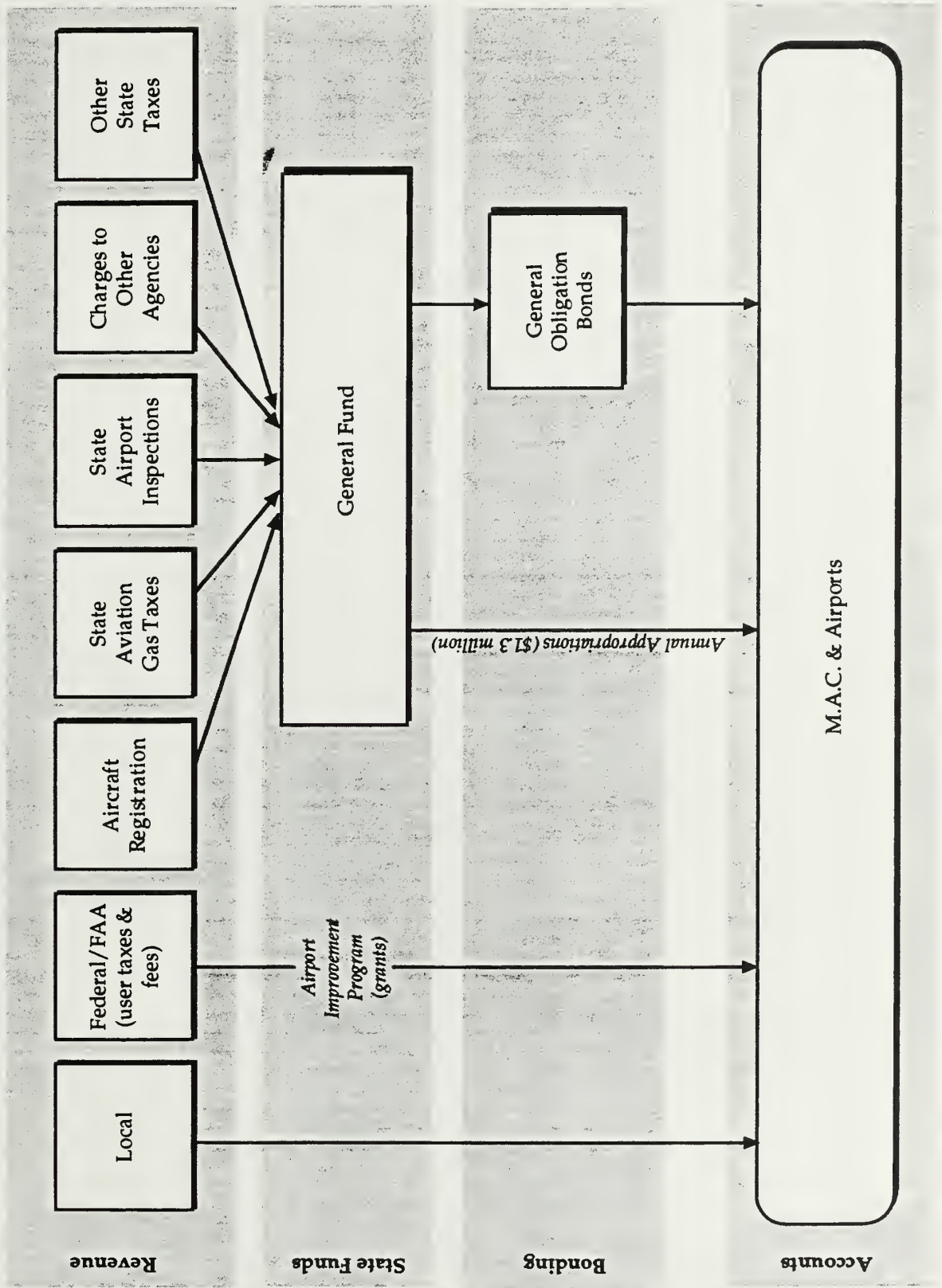


Exhibit 10-6. Massachusetts Port Authority

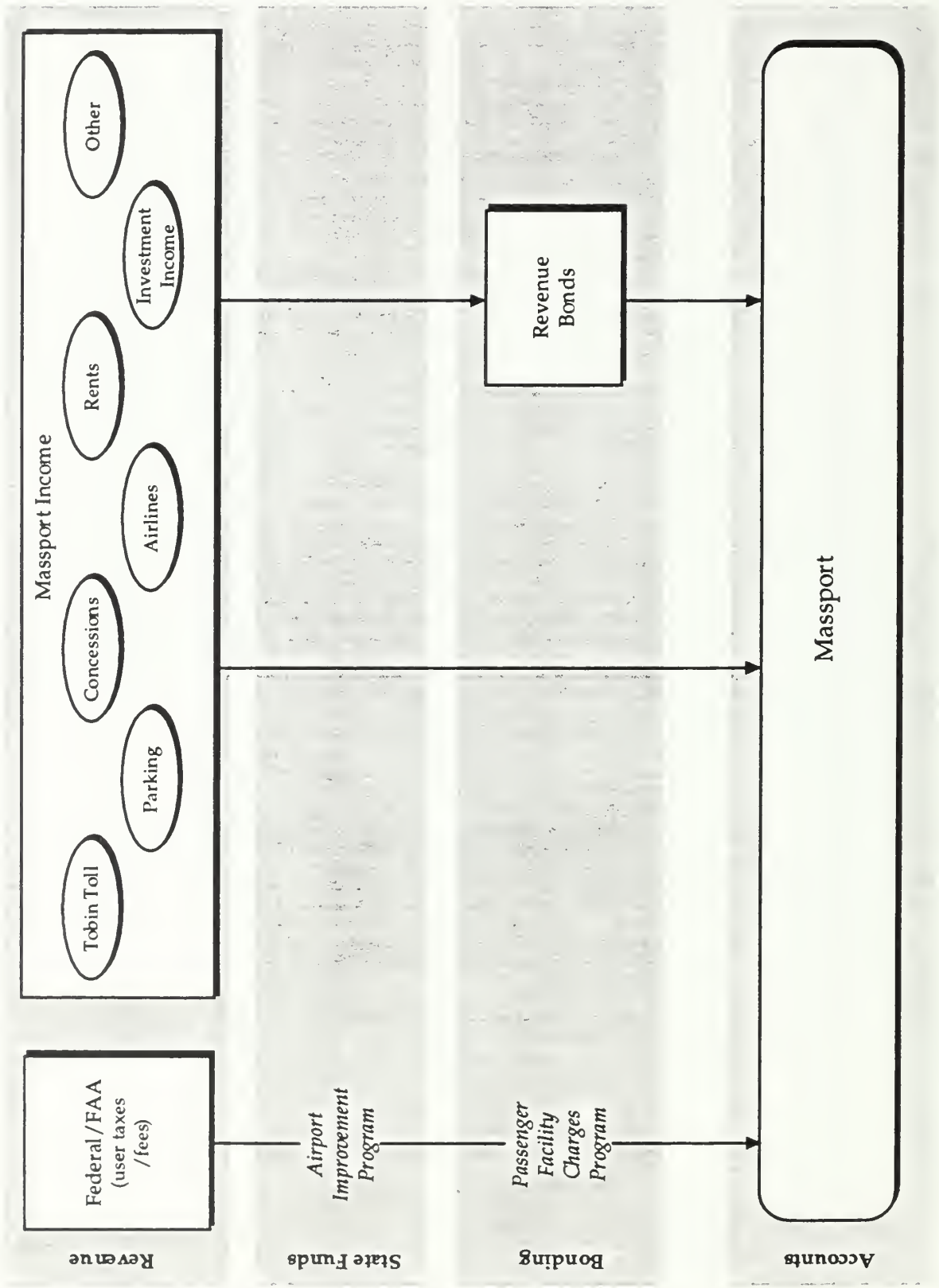
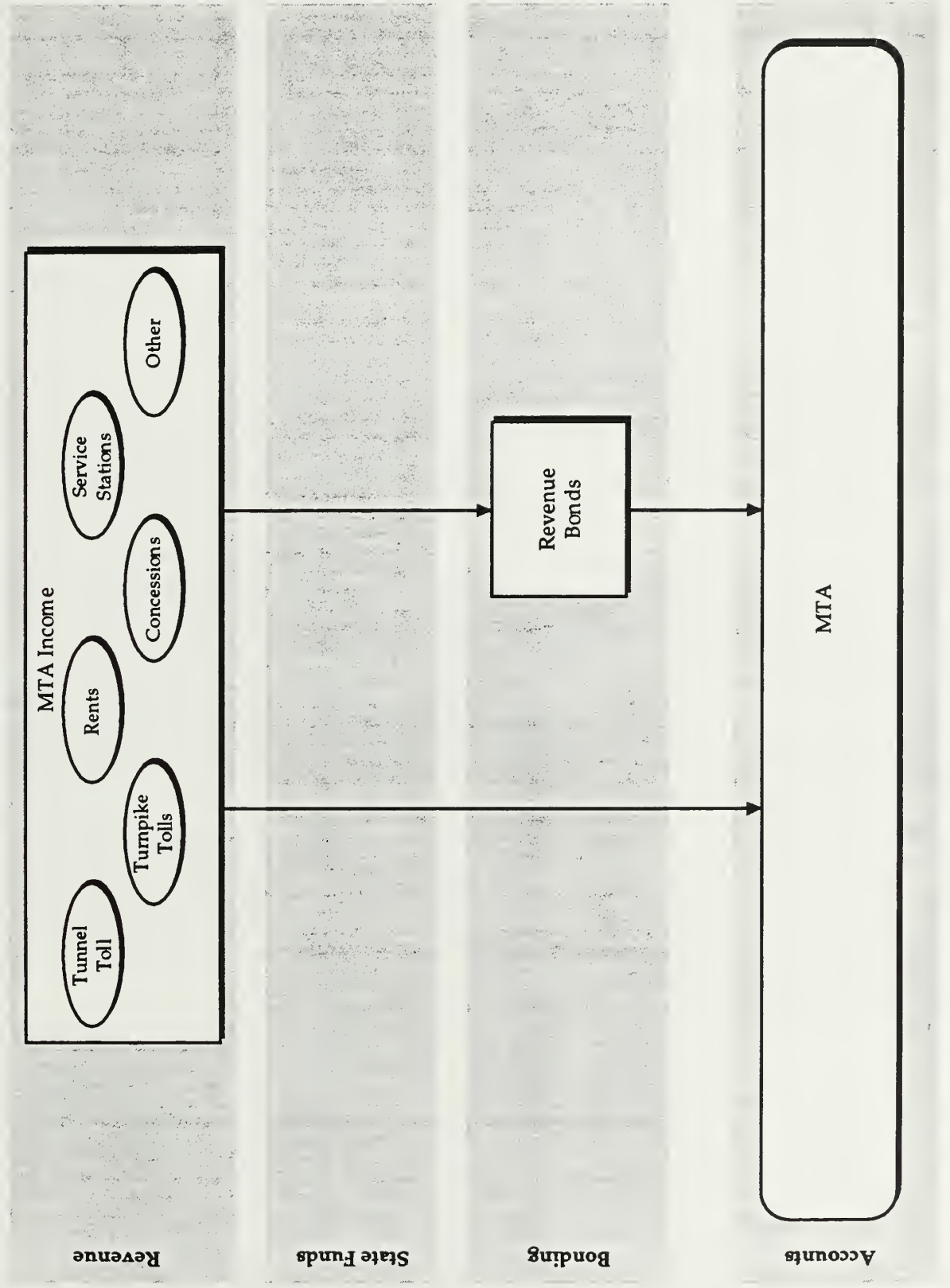


Exhibit 10-7. Massachusetts Turnpike Authority



OVERVIEW OF FINANCING METHODS IN OTHER STATES

Nationally, federal, state and local governments collected over \$80 billion for highway purposes and over \$16 billion for mass transit purposes in 1991.

Highways

As in Massachusetts, methods and sources used by other states for financing highway projects include federal aid, state motor fuel taxes, motor vehicle related user fees (such as for registrations or licenses), tolls and bonds. **Table 10-4** provides a compilation of the revenues generated for each state, by breaking down the sources by percentage. It should be noted that this data is a couple of years old (1992) and subject to some FHWA assumptions, in order to make various states' data comparable. In fact, Massachusetts statistics are subject to significant annual change, due in part to an influx in federal aid as a result of the CA/T Project. However, this is the latest federal data available and, although the numbers are unverified and somewhat outdated, it provides a general understanding of how the states pay for their highway improvement programs.

A growing gap between the financial needs of maintaining aging highway and bridge infrastructure and the funds available through "traditional" highway sources (such as federal funds and state taxes and fees) has motivated some states and local governments to implement more innovative methods for financing highway projects. The following are a few examples of this.

- In Virginia, a private, for-profit corporation is constructing the Dulles Toll Road Extension, without any financial contribution from the public sector. The corporation will operate the roadway as a toll facility and expects to profit from the tolls collected.
- Two local municipalities, in Oregon and Iowa, are charging developers an impact fee to generate transportation dollars for local projects. Developers are required to pay the fee, based on the estimated number of peak hour trips generated by the new development. The idea behind this method is that developers should help to pay for the infrastructure improvements that will be required as a result of increased traffic.
- The Florida Legislature recently passed a bill providing for a local fuel tax option. It allows cities and towns to charge a fuel tax - in addition to the federal and state tax - to fund local transportation projects. Prior to this legislation, municipalities relied on property taxes to fund these projects. The fuel tax requires that those who use the roadways more (and presumably use more gas) pay more to maintain the roadways.
- One revenue source that has received a great deal of attention nationally, as well as in Massachusetts, is private financing, which can be applicable to a wide variety of transportation facilities and services. The results with various privatization efforts have been mixed, but a number of states, including

Massachusetts, are taking major new initiatives to explore the potential for leveraging public resources with private investment.

In studying these and other methods of innovative financing, it is important to note that none are a panacea for the growing problem of funding transportation projects. For instance, private toll roads are not free roads. Users will have to pay a toll to use them, just as riders on the Massachusetts Turnpike (a public toll road) pay now. The only difference is that a private company, hoping to make a profit, takes in the revenue and not the state. In terms of impact fees, there is often the chance that the fee could discourage developers from ever building in a town or state that charges the tax; and a local fuel tax is still a tax - the public pays for the roadway improvements, regardless of how the tax is collected.

That is not to say that these ideas, and others, should not be considered. Under the appropriate circumstances, they may help to finance transportation projects where "traditional" funds just are not available. It must be kept in mind, though, that none provide a "free ride" for the public - someone has to pay for the them.

These and other alternative financing methods are further discussed later in this chapter.

Transit

Methods used by other states for financing transit projects include: direct income (such as fares, parking, and advertising revenue), federal aid, appropriations from the general and transportation funds, sales taxes, fuel taxes, bonds, and lottery and casino revenues.

As discussed earlier, the MBTA and RTAs of Massachusetts are funded, in part, by many of these sources as well:

- Direct Income, primarily from fares and parking;
- Federal Funds, through FTA and ISTEA transfers;
- Local Assessments, to communities that benefit from service;
- Highway Fund, through the state gas tax and other user fees;
- General Fund, through general state taxes and fees; and the
- Local Aid Fund, through lottery proceeds and a portion of the sales, income and other state taxes earmarked for programs that benefit local communities.

In comparison, **Table 10-5** shows how states other than Massachusetts provide financial assistance for public transportation. It should be noted that this data is from a draft survey, currently being conducted by the American Association of State Highway and Transportation Officials. As such, it is incomplete and subject to change. However, it does provide a general idea of how transit is being paid for across the nation.

Table 10-4
State Highway Funding Sources, by State

(percentage by Source)

State	Federal Aid	Motor Fuel Tax	Motor Vehicle Related Fees	Tolls	Bonds	Other State	Local Payment	Other Sources
Alabama	32.14%	48.82%	16.10%	0.00%	0.00%	0.44%	0.00%	2.50%
Alaska	52.46%	5.45%	5.28%	4.45%	0.00%	26.07%	0.00%	6.30%
Arizona	13.56%	26.64%	13.65%	0.00%	25.32%	7.37%	10.00%	3.46%
Arkansas	28.37%	46.98%	21.16%	0.00%	0.00%	0.36%	0.84%	2.29%
California	28.85%	38.10%	20.46%	1.95%	0.00%	3.22%	1.88%	5.56%
Colorado	33.06%	49.30%	16.48%	0.23%	0.00%	0.00%	0.00%	0.94%
Connecticut	27.29%	19.69%	9.40%	0.01%	28.86%	8.12%	0.09%	6.53%
Delaware	13.34%	12.35%	7.36%	12.88%	33.42%	17.83%	0.00%	2.82%
D.C.	28.16%	11.82%	15.75%	0.00%	13.03%	6.64%	0.00%	24.61%
Florida	19.79%	31.81%	19.36%	10.03%	7.29%	5.93%	0.86%	4.94%
Georgia	24.71%	23.79%	4.08%	0.09%	12.86%	30.24%	1.05%	3.18%
Hawaii	47.51%	15.37%	15.23%	0.00%	3.39%	13.22%	0.00%	5.27%
Idaho	33.95%	40.24%	24.93%	0.00%	0.00%	0.00%	0.87%	0.00%
Illinois	17.55%	31.39%	15.51%	8.56%	24.19%	1.13%	0.65%	1.02%
Indiana	29.53%	40.94%	11.02%	4.09%	5.33%	0.27%	1.26%	7.56%
Iowa	27.27%	32.21%	24.03%	0.09%	0.00%	13.27%	0.21%	2.92%
Kansas	13.36%	22.07%	8.67%	3.67%	32.69%	14.87%	1.26%	3.42%
Kentucky	17.95%	33.64%	35.66%	1.26%	0.00%	3.25%	0.30%	7.94%
Louisiana	29.91%	42.48%	11.35%	2.14%	11.09%	0.00%	0.00%	3.02%
Maine	22.17%	36.07%	13.53%	9.78%	16.63%	0.74%	0.00%	1.09%
Maryland	24.21%	28.21%	28.11%	5.84%	6.34%	3.54%	0.34%	3.42%
Massachusetts	37.42%	22.02%	14.14%	8.13%	15.04%	0.00%	0.03%	3.23%
Michigan	21.34%	30.42%	20.39%	0.70%	16.08%	4.75%	2.57%	3.75%
Minnesota	22.91%	35.42%	31.67%	0.00%	1.80%	0.70%	2.59%	4.91%
Mississippi	30.06%	45.31%	12.74%	0.00%	0.00%	8.51%	0.32%	3.06%
Missouri	32.94%	37.97%	17.08%	0.17%	0.00%	10.74%	0.77%	0.33%
Montana	48.78%	37.61%	12.14%	0.00%	0.00%	0.47%	0.00%	1.00%
Nebraska	25.99%	41.64%	8.95%	0.15%	0.00%	19.16%	2.67%	1.44%
Nevada	20.40%	47.45%	15.74%	0.00%	9.13%	4.50%	0.00%	2.78%
New Hampshire	17.48%	24.23%	15.73%	11.12%	25.18%	1.00%	0.81%	4.45%
New Jersey	13.02%	9.16%	5.76%	15.25%	44.05%	0.00%	0.10%	12.65%
New Mexico	36.33%	35.76%	25.54%	0.00%	0.00%	0.00%	0.00%	2.37%
New York	19.40%	13.27%	4.87%	14.88%	42.82%	0.00%	0.00%	4.75%
North Carolina	20.34%	52.49%	16.34%	0.09%	0.00%	4.04%	0.93%	5.77%
North Dakota	44.95%	31.29%	17.23%	0.00%	0.00%	1.88%	4.27%	0.38%
Ohio	20.41%	47.71%	21.85%	3.72%	4.34%	0.00%	0.47%	1.49%
Oklahoma	13.94%	23.87%	5.90%	5.49%	47.38%	1.62%	0.31%	1.49%
Oregon	31.24%	33.71%	22.55%	0.28%	4.98%	2.95%	0.90%	3.38%
Pennsylvania	19.30%	35.22%	14.05%	9.13%	19.20%	0.00%	0.48%	2.62%
Rhode Island	44.06%	18.84%	5.65%	3.27%	27.78%	0.00%	0.00%	0.42%
South Carolina	34.84%	52.44%	11.34%	0.00%	0.00%	0.00%	0.08%	1.30%
South Dakota	43.70%	32.40%	8.09%	0.00%	0.00%	11.21%	2.20%	2.41%
Tennessee	22.19%	37.65%	10.26%	0.00%	0.00%	28.15%	1.21%	0.54%
Texas	28.56%	43.93%	21.96%	1.38%	0.00%	0.60%	1.22%	2.34%
Utah	35.65%	44.71%	10.34%	0.06%	0.00%	8.21%	0.44%	0.59%
Vermont	35.70%	22.72%	27.66%	0.00%	8.17%	0.00%	1.97%	3.79%
Virginia	14.26%	27.68%	18.72%	4.70%	11.72%	17.83%	2.74%	2.36%
Washington	27.52%	31.33%	23.64%	4.32%	8.49%	0.01%	0.45%	4.24%
West Virginia	30.57%	30.59%	20.85%	5.25%	8.21%	1.44%	0.00%	3.09%
Wisconsin	22.12%	35.42%	14.27%	0.00%	23.66%	0.00%	2.22%	2.31%
Wyoming	57.30%	16.96%	12.39%	0.00%	0.00%	10.13%	1.01%	2.21%
Overall	24.14%	31.86%	15.85%	4.61%	13.85%	4.63%	1.06%	4.00%

Source: Derived from data in Federal Highway Administration, Highway Statistics 1992, Table SF-1.

Table 10-5
Sources of Direct State Financial Assistance for Public Transportation

FISCAL YEAR 1993								
State	General Fund	Transp. Fund	Sales Tax	Fuel Tax	Lottery Proceeds	Turnpike Revenue	Bond	Other
Alabama	x							
Arizona								x(1)
Arkansas								x(2)
California			x(3)					x(4)
Delaware	x(5)							
D.C.	x							
Florida		x						x(6)
Georgia	x							
Illinois	x						x	
Indiana			x					
Iowa								x(7)
Kansas				x				x(8)
Kentucky	x							
Maine	x			x			x	
Maryland		x						
Michigan			x	x			x	x(9)
Minnesota	x							
Mississippi	x							
Missouri	x							
Montana				x				
Nebraska	x			x				
New Hampshire	x							
New Jersey	x							x(10)
New York	x		x					x(11)
North Carolina								x(12)
North Dakota	x							x(13)
Ohio	x							
Oklahoma	x							x(14)
Oregon	x				x			x(15)
Pennsylvania	x				x		x	
Puerto Rico	x(16)							
Rhode Island	x			x				
South Dakota								x(17)
Tennessee		x						
Texas								x(18)
Utah	x							x(19)
Virginia								x(20)
Washington								x(21)
West Virginia	x							x(22)
Wisconsin		x						

(1) Auto registration; air quality surcharge; oil overcharge.

(2) Arkansas Act 61.

(3) Sales tax on gasoline and diesel fuel. State transportation bonds.

(4) Federal funds.

(5) Includes gas tax, toll revenues, etc.

(6) Transportation Disadvantaged Trust Fund.

(7) 100% use tax on motor vehicles.

(8) State highway fund; percent of motor fuel tax to state fund; discretionary grants to seven providers.

(9) Oil overcharge funds.

(10) Casino revenue fund.

(11) Gross receipts; long lines; corporate franchise; investment income; special revenue fund.

(12) Highway Fund; Highway Trust Fund.

(13) One dollar annual addition to license plate fee.

(14) Oil overcharge fund.

(15) Cigarette tax; In-lieu payroll tax.

(16) Legislative appropriation.

(17) Unclaimed agriculture gas tax rebates.

(18) State highway fund.

(19) Oil overcharge funds.

(20) Highway maintenance and operations fund; mass transit trust fund.

(21) State Senior Citizens Services Act; motor vehicle excise tax.

(22) T.R.I.P. ticket revenue; WV Department of Health and Human Services; WV Commission on Aging.

FINANCING OPTIONS FOR MASSACHUSETTS

Currently, the major sources of funding for Massachusetts are federal funds and state user fees and taxes. The following sections describe potential alternatives to state taxes for financing transportation in Massachusetts, as well as other states. It must be noted again that these alternative financing methods do not reduce the costs of transportation projects, per se. What they do is provide possible tools - from spreading costs to users or the private sector to generating funds by selling or leasing surplus properties, among other things. Massachusetts has been pursuing some of these mechanisms for some time. Others are not currently feasible due to legislative restrictions. However, all options must be considered in planning for long term transportation financing.

Private Sector Financing, Fees, and Payments

Several private sector financing methods have been explored to fund highway and other public facility improvements. While some of these methods may be most appropriate in areas where there is strong growth and development pressure, the widespread application of many of these concepts suggests the private sector is well aware of the critical role that public infrastructure plays in supporting economic development.

Private Ownership

Private development of a transportation facility is feasible when the facility has the potential to generate enough revenue to provide a competitive financial return to investors in the development or when a public agency is willing to provide a sufficient subsidy to make the investment attractive.

In the case of highways, the primary potential private sources of revenue are tolls and/or appreciation in the value of surrounding property. If these sources of revenue are not sufficient, and there is a clear public purpose in the project, public funds could pay a portion of the cost, either up front or over a period of years. An alternative to a privately operated toll road is the lease of a privately built facility by a public agency. Some situations in which a private development of a road may be appropriate are:

- If a private company could build a facility more quickly and less expensively; and
- If a developer is willing to pay the cost of the improvement because of the effect it will have on the value of the property he/she owns.

Special Benefit District Assessment/Impact Fees

A special benefit assessment is a tax placed on properties within a designated district that is expected to benefit from a public improvement. In this way, owners of properties that increase in value due to the improvement pay for all or part of the improvement (construction and/or maintenance). Determining the amount of benefit and the allocation of improvement costs to private property owners can be difficult, and is generally accomplished through the use of a formula that may

property owners can be difficult, and is generally accomplished through the use of a formula that may be based on site size, floor area, and distance from improvement, for example. The tax may be one-time or ongoing. Thus, revenues may be timed to coincide with bond payments. The tax must also be reasonable so as not to encourage businesses to select a different location in order to avoid the tax. An agency or municipality may make the special assessment, but special state enabling legislation is usually required.

Special benefit assessment has been used to pay for area improvements such as streets, sidewalks, and sewers, and for transit facilities and downtown pedestrian or transit malls. Special benefit assessment has also been implemented to finance general transit system expenses. A special benefit district could be associated with a highway interchange as well.

Incentive Zoning (for In-kind Improvement)

Incentive zoning offers a developer a bonus in the form of relaxation of a restrictive zoning law or procedure in return for inclusion of an amenity in the development deemed to be in the public interest. Additional development height, for example, could be awarded to a developer who will construct roads that will benefit the public as well as the development, or site the development to provide land for future road expansion. This method is a way of providing in-kind improvements rather than directly financing roads. Developer participation in incentive zoning is voluntary.

Negotiated Investments (for Contributions)

The concept of negotiated investments is similar to incentive zoning, but here developers agree to contribute funding for the cost of public improvements required to support their new development, rather than providing in-kind improvements. Again, this is generally done in exchange for changes to existing land use regulations as agreed to by the local zoning authority. While the use of zoning approvals in this manner has been legally challenged in some cases as allowing "bribes" for relaxing zoning regulations, bargaining is permitted in some states where the developer and planning commission have considerable flexibility in determining densities and improvements, and where enabling legislation or local ordinances explicitly define procedures and permissible negotiations. A negotiated investment strategy is most suitable for areas where the location is very desirable and the competition for development is keen. Funding contributions can also be voluntary or semi-voluntary.

Dedications and Exactions (Required Fees)

While incentive zoning and negotiated investments provide zoning incentives for in-kind or cash contributions, dedications and exactions require contributions. Dedications require a developer to provide land or public facilities as a condition for development approval; exactions require a cash payment. The policy assures provision of public improvements at the same time that private development is occurring. The dedications and exactions should be legally reasonable requirements, i.e., directly related to the project. Thus, if dedications/exactions are linked to road improvements, they are probably most appropriate for local streets.

Dedications and exactions have historically been widely used in suburban subdivisions to provide a variety of facilities such as sewer and water lines, parks, and schools. Roads thus compete against a variety of other needed improvements for funds. There may be difficulties using the policy for a new development in an urbanized area where existing developments would also benefit from a public improvement but have not been subject to a dedication or exaction.

Special District Zoning (Special Planning Districts)

Special district zoning is a variation on the concept of dedications. It specifically applies to a designated special district, which is an area given detailed planning due to its special planning problems, such as historical importance or strong redevelopment pressures. The master plan for the district includes specifications about how each parcel of land may be used. It can include mandatory requirements on developers, such as provisions of transportation-related improvements. While incentive zoning gives developers the option of complying, special district zoning generally requires compliance. Special district zoning also requires strong planning capabilities on the part of the locality.

Leasing/Selling Development Rights

Under this financing scheme, the air, ground, or subsurface rights of parcels associated with a highway are sold or leased. The most frequent use has been for transit finance, where transit agencies lease land above a subway station for building construction, although the leasing/selling of air rights can also pertain to the spaces over highways.

The leasing/selling of development rights is only applicable to certain situations. Because the costs of air rights construction are higher than for normal construction, developers are only interested in the idea in strong real estate markets that can provide a sufficient rate of return, generally in high density, desirable locations where land is at a premium and in circumstances where urban development funding is available to provide below-market interest rates. For a strong legal position, the agency leasing/selling development rights should have state legislative authority to do so.

Leasing/Selling Surplus Property

To generate revenue, some public agencies sell or lease surplus property to the private sector. The entire property or a portion of it may be leased. The use of this financing technique need not be limited to property that is no longer required by the agency, but may apply to new projects as well. Although this method of finance has most often been used by transit agencies, highway departments may also have some excess land to lease or sell adjacent to highway interchanges. It is important to note that it is generally not legal for an agency to acquire more land through eminent domain than is actually needed and then lease or sell it, but this strategy can be applicable if purchase of land for advanced right-of-way acquisition (land banking) is initiated.

Tax Increment (Tax Allocation) Financing

Under tax increment financing (also called tax allocation financing), public improvements in a designated area are paid for using the projected increases in property tax revenues that are a likely result of the improvements. Those projected increases over initial levels (i.e., the increment of tax revenue) are usually then allocated to back a bond. The method does not increase the tax rate in the designated area, nor does it reduce the amount of taxes from the area that goes into other funds. It uses only the incremental increase in tax revenues that result from the increased value of properties in the designated area. Because such an area expected to benefit from the improvements must be designated, tax increment financing is appropriate for site-specific projects such as highway interchanges, or local street improvements. Its historical use has been for urban redevelopment projects, where property values would not be expected to increase in absence of the public improvements.

To be used, tax increment financing requires state enabling legislation and local ordinances. In cases where authority is given to urban redevelopment agencies, intergovernmental agreements may be required for highway use. Tax increment financing may also arouse the resistance of other taxing jurisdictions and recipients that rely on property tax revenues because of fear they will be deprived of additional revenue by tax increment districts, and/or they will have to make new outlays for districts without receiving additional revenues. This may be mitigated by using only a percentage of the property tax increases to back the bonds or by severely limiting the amount and/or value of property in a jurisdiction that may be part of a tax increment district.

Institutional and Intergovernmental Approaches

A number of financing methods are based on intergovernmental cooperative arrangements for sharing a tax base or debt risk.

Regional Tax Base Sharing

Under regional tax base sharing, all governments within a given region share a percentage of the regionwide growth of the tax base. Such a tax base sharing plan is based on annual calculation by each local government of the difference in assessed value of all commercial and industrial property within its boundaries between the current year and the base year. A percentage of this growth is contributed each year to a regionwide base, the funds from which are then distributed to all governments in the region by a formula based on population and inversely related to its relative fiscal capacity (i.e., the per capita market value of all real property relative to the metro area average). In effect, each commercial/industrial parcel of property is taxed at two rates # a) an area average mill rate applied to the proportion of each parcel's assessed value that is contributed to the regionwide base, and b) the local mill rate is applied to the remainder of the assessed value.

Under the plan, each local government continues to determine its own level of taxation and the plan is operated without any new administrative apparatus. Advantages are that the plan can reduce intercommunity tax base inequities and competition for development, thus helping to stimulate a more efficient pattern of land use and development patterns in which regional rather than purely local considerations are taken into account.

Regional or State Infrastructure Banks

Traditionally, bonding has been an important source for financing local public projects. One means of lowering bond issuance costs and increasing access to credit markets for local governments (and possibly also lowering debt costs) is pooling -- i.e., setting up a special regional or statewide "bank" for financing local capital projects.

Local Government Banks

In western Europe, municipally owned savings banks are common, and local infrastructure finance is provided in part through those banks. In the United States, state bond banks have been created to issue bonds on behalf of local governments. They have also been created to issue debt for which the proceeds are then used to purchase local bond issues. These bond banks have all received a rating one category below the state's regular bond rating based on the moral obligation of the state. Since local governments (particularly small ones with no bond rating) pay higher interest on privately borrowed funds, the sale of bonds to the state bond bank allows them to assume the bond bank's higher rating. This reduces the cost of the debt issue and thus the project it funds.

State Infrastructure Banks

The establishment of state-sponsored banks specifically intended to fund infrastructure construction and rehabilitation is another funding option. Banks would obtain initial funds by issuing bonds, obtaining state appropriations and drawing on unused state revenues. "Second generation" income would be generated by a revolving loan fund. Banks could also be funded by revenue bonds backed by fees and payments, as well as state funds earmarked for local projects.

Loan Pools

Short of setting up a separate financing bank is the concept of state loan pools for use by municipalities. In general, the concept of an infrastructure bank has the advantage that it helps establish a priority for infrastructure in terms of ensuring the availability of some funding for it. Depending on how funds are distributed to local governments, a regional infrastructure bank (as opposed to a local or state fund pool) has the potential to concentrate on funding of construction needs which are regionwide in importance, which otherwise would not receive the same priority at the state or local level.

CHAPTER 11

ENVIRONMENTAL QUALITY & TRANSPORTATION

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 ushered in a new era of transportation planning. In particular, it recognized a specific relationship between transportation and the natural environment. It set forth a broad policy that the two be made to conflict as little as possible and enhance each other where feasible.

Federal transportation agencies have acted on this new policy by adopting procedures that help to implement ISTEA's environmental objectives. For example, the Federal Highway Administration is striving to integrate environmental considerations into the decision-making process and the overall federal highway program. Although federal highway planning and project development have explicitly dealt with environmental issues for the past 25 years, due to the National Environmental Policy Act (NEPA), the Clean Air Act, the Clean Water Act, and other laws, environmental objectives and programs are now an integral part of federal transportation legislation. This is of great importance to state transportation agencies and programs both because state transportation planning and programming must conform to federal planning guidelines and because the bulk of transportation funding for most major projects is from federal sources.

Massachusetts is not simply following federal requirements in producing this transportation plan. The state is following through on long-standing commitments to integrate environmental, economic development, energy conservation, and transportation improvements to enhance the quality of life for all of its citizens. It is the policy of the Executive Office of Transportation and Construction to avoid environmental impacts where possible, minimize the extent of impacts that are unavoidable, mitigate impacts that cannot be prevented, and enhance the environment through transportation programs and projects where feasible.

MEETING THE CHALLENGE

Twenty years ago there was a sense that transportation construction projects and environmental protection were in opposition to each other. To state transportation officials, environmentalists were an enemy standing in the way of needed improvements that were intended to improve safety, increase personal mobility, and create economic development. To environmentalists, transportation, particularly road-building, was the cause of much environmental degradation resulting in loss of wildlife habitat, polluting of bodies of water, spewing of toxic emissions into the air, and eroding of the soil.

Fortunately, much has changed over that period of time:

- Working relationships have been developed between transportation and environmental bureaus and agencies.
- Common vocabularies have been created between transportation and environmental planners and officials, and means have been devised to avoid and resolve conflicts.

- Alternative analysis based on comparative costs and benefits has become far more sophisticated and accurate.
- Environmental policy staff and technical analysts have been added to transportation agencies to integrate environmental objectives into policies and plans as well as the design of projects.
- Design manuals and new management practices have been developed or are underway to assure that environmental values are protected throughout a project's lifetime.

Federal and state legislation have set out mandates and deadlines for compliance with environmental standards that have forced agencies to come to grips with new political realities and public expectations. However, there has been a genuine shift in attitudes on the part of transportation officials, particularly in Massachusetts, whereby environmental values are now integrated into the transportation agenda. This is a crucial factor in meeting the challenge of serving the future transportation needs of the public while protecting the natural environment and enhancing the quality of life in the Commonwealth.

CLEAN AIR

The Clean Air Act of 1970 formed the basis of the federal air pollution control program. Since then it has been amended numerous times, most recently in 1990. This extremely complex piece of legislation covers air pollution from virtually all sources, not just from transportation. However, this law has profound implications for transportation policies, plans, programs, and projects, particularly in those areas, such as Massachusetts, where air quality has failed to meet the National Ambient Air Quality Standards (NAAQS). Although some parts of the state were found to be in the classification of "moderate" non-attainment for ozone, the Governor decided to declare the entire state to be in "serious" non-attainment. This decision had the advantages of uniformity and it allowed a longer time period for compliance with air quality standards.

Air quality issues are dealt with through the development of the State Implementation Plan (SIP), the preparation of an statewide emissions budget (which is an annually adjusted budget based air-quality analyses for mobile and stationary sources) for transportation, the computer modeling of air quality impacts of projects, and the conformity process. These are described in more detail in the Regulatory Framework chapter of this document.

It is the policy of the Executive Office of Transportation and Construction to:

- Prevent transportation policies and plans from conflicting with air quality improvement requirements.
- Ensure that transportation initiatives will serve to support air quality goals.

- Restrain growth in vehicle trips, vehicle-hours of travel, and vehicle-miles of travel through incentives, new technology, and imaginative planning to achieve economic development goals and environmental objectives.

CLEAN WATER

Water quality protection policies and practices have been established to ensure compliance with the federal Clean Water Act, Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990, the Massachusetts Environmental Policy Act, Coastal Zone Management Consistency Review, and Chapter 91 of the Massachusetts General Laws. These laws, and the regulations, procedures, and practices derived from them, serve to protect the state's water resources for a number of values and uses important to the public interest, including protection of wildlife and plant habitat, public and private water supplies, recreation, and a better quality of life.

Wetlands Protection

Both coastal and inland wetlands have been protected for 30 years in Massachusetts through the administration and enforcement of several state laws, including the Wetlands Protection Act (MGL c. 131 §40), and regulations developed to administer these laws. Wetlands protection is important to the preservation of wildlife habitat, protection of public and private water supplies, flood prevention and attenuation, lessening of storm damage, and prevention of groundwater contamination.

State transportation agencies have developed policies and practices designed to comply with these laws as well as to achieve the purposes of the laws. A principle being observed is that there be no net loss of wetlands as a result of transportation projects. For example, the Massachusetts Aeronautics Commission has prepared a Generic Environmental Impact Report, approved by the Secretary of Environmental Affairs, that governs the management and control of trees and other vegetation growing in wetland areas that could create safety hazards for aviation activity.

New initiatives that are planned or underway include the development of best management practices for drainage work and wetlands replication. The Massachusetts Highway Department is also participating in a multi-agency effort to explore the potential of wetlands banking, including the creation of a way to trade or earn credits for the creation of wetland areas in excess of those required for replication due to loss resulting from construction.

Coastal Non-point Pollution Control Program

States are required under the Coastal Zone Reauthorization Act Amendments of 1990 to develop Coastal Non-Point Pollution Control Programs to implement management measures for non-point source pollution by integrating the activities of federal, state, and local authorities. An example of useful collaboration engendered by this requirement is a program to protect and restore shellfish beds impacted by storm drain discharges, which was developed jointly by the Massachusetts Bays Program, the Division of Marine Fisheries, and the US Soil Conservation Service. Management measures are to be developed and incorporated at the early stages of highway project development to address issues

of siting, design, chemical controls, operation and maintenance practices, and storm water control systems.

Storm Water Runoff Control

Storm water runoff and melting snow and ice from highways and parking lots can be harmful to nearby water resources and water supplies. Contaminants picked up and transported by runoff have been found to adversely affect nearly all lakes and ponds, and most rivers and streams. The Massachusetts Highway Department has moved aggressively to develop new and improved designs and management practices to greatly reduce the contamination of water resources from state roadway drainage systems. Rather than discharging runoff directly into waterways, it is subjected to a series of processes to remove petroleum contaminants, filter sediments, and slow its velocity. The Department has incorporated new standards into its designs and specifications for construction projects. In addition, the Department is devising a priority list of sites for remediation of existing systems, starting with the most sensitive locations.

Road Salt Use

The Massachusetts Highway Department has taken a number of steps to limit the use of salt to control ice and snow on state highways. Salt is mixed with sand, and its application is governed by the calibration of spreaders mounted on trucks. The spreaders are now set to deliver about half the rate of salt applied before 1993. The Department has also established certain zones where no salt is used in order to protect groundwater aquifers. In addition, the Department has been trying out an alternative deicing product, calcium magnesium acetate, in environmentally sensitive areas with some success. However, this material is far more expensive than traditional salt, and its use is therefore expected to be limited.

Dredging Activities

Dredging of harbors and navigational channels is necessary to maintain adequate depths for safe movement of vessels and the conduct of commerce, including the accommodation of newer and longer vessels. Due to the action of currents and the churning caused by propellers, sedimentation of channels and harbors occurs over time, necessitating the periodic removal of silted material. Dredging inevitably causes disruption of the bottom of such areas, affecting sea life and water quality in the vicinity. It also creates a disposal problem with regard to the dredged material. A place must be found to deposit this material, and sometimes contains harmful contaminants that must be dealt with. In general, Massachusetts requires an Environmental Impact Report to address these impacts. Often there is a joint federal-state review involving a number of agencies, such as the proposed dredging of Boston Harbor by the US Army Corps of Engineers in association with the Massachusetts Port Authority.

It is the policy of the Executive Office of Transportation and Construction to:

- Be in full compliance with the federal Clean Water Act, Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990, the Massachusetts Environmental Policy Act, Coastal Zone Management Consistency Review, and Chapter 91 of the Massachusetts General Laws to protect the state's water resources for values and uses important to the public interest, including wildlife and plant habitat protection, public and private water supplies, recreation, and a better quality of life.
- Assure that there is no net loss of wetlands as a result of transportation projects.
- Promote new initiatives such as development of best management practices for drainage work and wetlands replication, and participation in efforts to establish a wetlands banking system.
- Protect coastal natural resources to enhance water quality and associated benefits such as restored shellfish beds.
- Develop new and improved designs and management practices to reduce the contamination of water resources from state roadway drainage systems.
- Continue to explore ways to reduce or limit the use of road salt without compromising public safety.
- Support a coordinated process for review and approval of proposed harbor and channel dredging activity.

HAZARDOUS MATERIALS AND HAZARDOUS WASTES

Transportation commonly involves hazardous materials. Vehicles are mostly fueled by petroleum products, which are classified as hazardous materials. These and other hazardous substances are also transported in bulk over the roads and rails of the Commonwealth. In addition, transportation agencies use and store a variety of hazardous materials for cleaning and maintenance activities. Due to the potential of such materials to adversely affect the health and safety of transportation workers, travelers, and the public at large, the storage and use of these substances are highly regulated and managed.

A special category of hazardous materials is hazardous waste. Such materials may need to be identified, contained, labeled, stored, neutralized, transported, and disposed. Proper records of these activities must be kept, and some operations may require licensed professionals or technicians to assure that they are properly carried-out.

Reducing the use of hazardous materials will tend to result in the reduction of hazardous waste. Thus, there is a double benefit to avoiding the use of hazardous substances to begin with.

It is the policy of the Executive Office of Transportation and Construction to:

- Avoid use of hazardous materials as much as possible. It is often feasible to find non-toxic substitutes that perform satisfactorily.
- Minimize the use of such substances, using them in the lowest feasible concentrations, using them only where there is no good alternative, and keeping the smallest amounts on hand as is reasonable.
- Conduct research on materials of lower toxicity that may be substituted without undue loss of performance.
- Provide ample training and protection for transportation workers who may come into contact with hazardous materials.
- Maintain hazardous materials and waste management policies and procedures to assure the safety of workers and the public.

LAND USE

Activity naturally implies movement, and that translates into what transportation planners and engineers call "trips". Different classes of activities, or land uses, produce various rates of activity, and thus different levels of traffic. Greater numbers of land uses create demand for more capacity and variety of transportation infrastructure.

The primary environmental issue pertaining to land use is the interaction between mobility and efficient use of natural resources (land, water, public utilities, roads, bridges, and public funds). In suburban and rural areas, mobility essentially means travel by automobile because densities are too low to make public transportation feasible or effective. In addition, the demand for parking forces development to spread out. Land use policies that keep densities low create an environment where activities are dispersed and therefore cause consumption of far more land than would be the case where higher densities are allowed and encouraged. When trip origins and destinations spread farther apart, overall travel distances increase, thereby creating more air pollution. There is a trade-off between personal mobility - the ability to travel when and where one chooses - and environmental impacts.

It is the policy of the Executive Office of Transportation and Construction to:

- Encourage localities to learn about the transportation effects of land use and density controls, and to develop plans and land development controls that avoid sprawling low-density patterns.

- Support state policies that favor siting state facilities in locations that are well served with infrastructure, including transportation, that can accommodate such facilities. State installations that attract large numbers of daily trips should be directed toward sites that have a diversity of transportation alternatives and good access characteristics.
- Promote incentive-based programs for ridesharing and parking management.
- Insist that traffic mitigation measures in state environmental reviews and approvals, such as Section 61 Findings, support alternative travel modes, such as walking, bicycling, and public transit, in public and private development projects.

TRANSPORTATION PROGRAMS

Transportation Enhancements

Transportation Enhancements are defined by the Federal Highway Administration as part of ISTEA. They require states to set aside ten percent of their share of surface transportation funds for projects that serve to enhance the transportation system. The purpose of Transportation Enhancement funding is to improve the quality of experience for transportation users through the creation of projects that are over and above what is considered routine construction or maintenance. These projects should enhance or add community, environmental, scenic, or historical value to a transportation project or project area.

Each state has flexibility, within the limits of the law, to create a program that best suits its respective needs, specific categories eligible for enhancement funding have been established through Federal legislation. ISTEA has allotted a significant amount of money to be used by states for their transportation enhancement projects. These may include upgrading of existing transportation facilities, recreation trails, preservation of historic transportation facilities, or storm water runoff control.

Massachusetts is in the process of revising its Transportation Enhancement Guidelines in order to coordinate eligible Enhancement projects and to assure that the Enhancement Program selects projects of the highest quality and significance to the Commonwealth. It is the intent of the program to fund projects that enhance the transportation system and support Federal guidelines and eligibility criteria. The Commonwealth's Enhancement Program is currently working toward implementation of 26 projects which address a broad range needs.

Open Space

Open space may be consumed as a new or widened transportation corridor is developed; it may also be preserved or enhanced as a result of transportation projects. Open space acquisition and enhancement activities have been conducted in conjunction with major highway projects, such as the Central Artery project in Boston and the development of a new Route 146 in Worcester and Millbury.

The state's Open Space Program focuses on the protection of scenic and natural qualities of the Commonwealth. To achieve this goal the program purchases parcels of land adjacent to the roadways.

It is the policy of the Executive Office of Transportation and Construction to:

- Assist in the protection of landscapes of outstanding scenic, natural, or historic quality.
- Protect, through acquisition of lands within or adjacent to transportation corridors, gateways to tourist destinations.
- Acquire, through fee or less than fee interests, transportation-related sites that are crucial to the maintenance and protection of valuable resources, such as habitats of endangered species or important historic sites.
- Work with other state and local public and private organizations toward cooperative relationships to assure long-term management and maintenance of open space parcels acquired by state transportation agencies.

Historic Preservation

Transportation agencies have an important role to play in protecting historic resources. State and federal laws and regulations require evaluating alternatives for achieving a transportation objective, and comparing how each would impact the environment, including historic resources. Avoidance of impacts of projects is desired, and mitigation is necessary where impacts can't be prevented. Since the enactment of ISTEA, the role of transportation agencies has been expanded to allow the enhancement of projects through the acquisition, restoration, or adaptive reuse of historic properties.

It is the policy of the Executive Office of Transportation and Construction to:

- Cooperate with the Massachusetts Historical Commission and other state and federal agencies in the development of policies, plans, programs, and projects that are consistent with broad historic preservation and enhancement objectives.
- Take into account at the earliest stages of a project the presence of any historic resources.
- Avoid the loss or destruction of historic resources due to transportation agency actions.
- Minimize adverse impacts of transportation projects on historic resources to the extent feasible when total avoidance is not possible.
- Mitigate any adverse consequences to historic resources caused by transportation agency projects.

- Encourage the submission of proposals by regional planning agencies of historic preservation and improvement projects for consideration for Enhancements funding.

Scenic Byways

It is the transportation policy of the Commonwealth to develop a Scenic Byway Program. This program would protect and promote designated roads of highways within the Commonwealth and meet established criteria for scenic byways designation. Current projects in the planning stages include:

BICYCLE AND PEDESTRIAN PROGRAMS

Massachusetts recognizes that bicycles and pedestrians are a significant and growing component of the Commonwealth's transportation mix. In addition to adding new off-road facilities to the system, the Commonwealth is also advancing a number of initiatives to make it easier, safer, and more pleasurable for people to travel by bicycle or walking on existing streets.

It is the policy of the Executive Office of Transportation and Construction to:

- Plan, promote and provide safe travel for cyclists and pedestrians, recognizing that bicycling and walking have distinct operational needs.
- Adopt a statewide bicycle policy and a statewide pedestrian policy to promote safe bicycling and walking and develop separate statewide bicycle system and pedestrian system plans.
- Make bicycle and pedestrian facilities an integral part of the highway system by designing, building, reconstructing, and maintaining roads and bridges to accommodate these modes.
- Revise the Mass. Highway design Manual to more fully incorporate state-of-the-practice bicycle and pedestrian elements.
- Implement "traffic calming" programs that reduce motor vehicle speed and volume.
- Develop a comprehensive off-street system of multi-use trails.
- Provide safe and convenient ways to take bikes on buses, trains, ferries, and airplanes.
- Plan, provide, and promote the needs of bicyclists and pedestrian through local, regional, and state land-use policies such as site-plan review, the state environmental review process, and others.

- Include bicycle parking facilities as a parking management strategy.
- Develop more bicycle and pedestrian facilities that support the Massachusetts tourism industry.

ENERGY CONSERVATION

According to the Massachusetts Energy Plan, 32% of all energy demand in Massachusetts arises from the transportation sector. Half of all of the petroleum used in the state goes into the fuel tanks of motor vehicles, aircraft, trains, and vessels. Thus it is hard to ignore the importance of energy in the transportation plans and policies.

Energy use for transportation has increased over the past fifteen years despite improvements in gasoline mileage per gallon of newer cars. Inexpensive gasoline, urban sprawl, growth of suburbs as major employment centers, and an increase in the number of multiple wage earners in households are factors that have led to higher levels of automobile ownership, more daily trips, and higher annual vehicle miles traveled.

Waste and inefficiency in the use of energy resources need to be addressed if the state is to avoid excessive costs for residents and businesses. Waste rarely benefits anyone, and it saps the spending power of individuals and reduces the competitiveness of businesses and industries.

Alternative fuels for vehicles offer a way to achieve greater independence from foreign sources of petroleum and gain price stability due to a more diverse set of fuels. In addition, air quality will be improved, particularly for volatile organic compounds (VOC) and carbon monoxide, as the proportion of alternate-fueled motor vehicles in the state fleet rises.

Facilities management practices that seek to increase efficiency are an important energy conservation strategy. Transportation agencies own a great number and variety of properties, many of which could benefit from energy conservation improvements. Part of the Clean State Program focuses on this issue, urging agencies to conduct energy audits and make improvements that offer reasonable benefits.

It is the policy of the Executive Office of Transportation and Construction to:

- Support the policies and recommendations of the Massachusetts Energy Plan.
- Support the development of alternative fuel technologies for motor vehicles, and assist in the development of infrastructure for refueling.
- Continue to improve the availability and quality of low-energy forms of transportation, such as walking, bicycling, and transit.
- Encourage the development and refinement of the transportation system in Massachusetts to work more and more efficiently.

- Encourage the development of automotive technology that improves fuel efficiency and energy conservation.
- Move forward in improving the energy efficiency of transportation buildings and other facilities.

NOISE

Noise emanates from a wide variety of transportation-related sources, including vehicle engines and tires, ventilation fans, emergency vehicle sirens, and rail and subway car wheels and brakes. Excessive noise can impair sleep, interfere with conversation, and, in extreme cases, damage hearing. Transportation facilities and vehicles constitute a major source of noise, particularly in urban areas.

Noise reduction is best addressed at its source. For example, new "Stage III" aircraft are far quieter than earlier models and their increasing use is having very beneficial effects on areas close to airports. Mitigation strategies where source reduction is not feasible may be desirable and appropriate in some areas. Increased insulation and special windows can offer added protection to building occupants, and noise barriers along railways and busy highways can be effective in shielding nearby properties from excessive levels of sound.

It is the policy of the Executive Office of Transportation and Construction to:

- Reduce noise generated by transportation at its source wherever possible.
- Establish noise mitigation strategies in locations where noise levels exceed reasonable limits.

STATE INITIATIVES

The above federal and state regulations and mandates illustrate the numerous and often innovative ways the Commonwealth is responding to environmental legislation. The state has also pioneered programs and projects that exemplify a desire to assure that we are not only maintaining established environmental standards but embracing ways to protect, preserve and enhance our environment.

The Clean State Initiative

In February, 1993 Governor Weld signed Executive Order #350, which established the Clean State Initiative. One part of this program is directed at bringing all state agencies into compliance with state and federal environmental laws. The second part is aimed at preventing pollution and conserving natural resources. State agencies are required to report periodically on the status of environmental violations of laws, regulations, etc. A master list of all such compliance matters is maintained. Each state secretariat prepared and submitted a pollution prevention and resource conservation plan. Recommendations in the plan produced by the Executive Office of Transportation and Construction included the following;

- Environmental audits and pollution prevention.
- Procurement, purchase of materials, and inventory control.
- Source reduction, conservation, and recycling programs.
- Energy and water conservation.
- Air quality.
- Non-point source reduction.
- Indoor air pollution.
- Noise pollution prevention.
- Education program.
- Monitoring and evaluation.

The Massachusetts Energy Plan

The Division of Energy Resources published **The Massachusetts Energy Plan** in 1993, which set out an ambitious array of goals and strategies designed to improve efficiency, decrease costs, and reduce dependence on unreliable sources of energy. One of the five principal recommendations in the plan is to "Increase efficiency and diversity in transportation energy use". Four strategies were identified to accomplish this:

- Stimulate the market for alternative fuel vehicles.
- Encourage energy efficiency in vehicles.
- Prioritize energy use in transportation planning and investment.
- Initiate a comprehensive "Green Travel Employer" campaign.

The plan aims to achieve a long-term reduction in energy consumed in the movement of people and goods, increased security of supply, and effective reductions in the emissions of harmful air pollutants largely through a combination of incentives and investments. Among the results envisioned by implementation of the plan are reduced traffic congestion, improved energy efficiency, and growth of energy-related businesses in Massachusetts.

Choosing to Compete: A Statewide Strategy for Job Creation and Economic Growth

Choosing to Compete, published in 1993 by the Executive Office of Economic Affairs and the University of Massachusetts, is intended to serve as a blueprint for Massachusetts state government to help create a business environment that will lead to economic growth, innovation, and job creation. The key action category for transportation is titled "Improving the Infrastructure Base", which urges the greatest possible enhancement of the Commonwealth's competitive advantages by giving priority to projects having the most positive impact on productivity and prospects for long-term permanent job growth. An important aspect of **Choosing to Compete** is that it recognizes that the environment is a vital asset of the state, and that economic development and associated transportation infrastructure development must be compatible with environmental values.

Central Artery Commitment Tracking

As the Central Artery/Third Harbor Tunnel project has evolved through programming, design, environmental impact analysis, permits, and contract processes, there have been numerous requirements, conditions, and agreements (collectively known as *commitments*) made with federal, state, municipal, and private entities. Many of these will be met through normal contracting documents and procedures. For some of the commitments, however, the direct responsibility for implementation is not readily apparent. The sources of the commitments are numerous including: Certificates issued by the Secretary of Environmental Affairs for Environmental Impact Reports, Federal Highway Administration Record of Decision, agreements with the City of Boston and Cambridge, an agreement with the Metropolitan District Commission, and a memorandum of understanding with the Conservation Law Foundation. All of the commitments made in these documents have been put into a master list and sorted into categories, such as Transit, Open Space, Air Quality, and Traffic Management. A data base has been created and is periodically updated to keep track of these "orphan" commitments, it documents the current status of each commitment. This assures that public concerns about environmental impacts of major projects like the CA/T are properly addressed. A summary spreadsheet called the Commitment Status Report (or CSR) is prepared quarterly and submitted to the Central Artery Environmental Oversight Committee, among others.

Central Artery Environmental Oversight Committee

The Central Artery Environmental Oversight Committee is an independent advisory committee established to monitor progress by the Central Artery/Third Harbor Tunnel (CA/T) project, including actions by EOTC and EOEA toward implementing the air quality, traffic management, transit, and open space commitments. Appointment of the Committee was included in an agreement signed on June 6, 1991 by the Secretaries of EOTC and EOEA, along with chief executives of several other organizations. The membership of the Central Artery Environmental Oversight Committee includes representatives of a variety of interest groups, including the Artery Business Committee, MOVE Mass. 2000, MAPC, the MBTA Advisory Board, Boston Green Space Alliance, 1000 Friends of Massachusetts, Spectacle Island Park Advisory Committee, and the Bridge Design Review Committee. State transportation and environmental agency officials are ex officio members of the Committee.

The Committee's principal concern is progress in meeting CA/T project commitments, and there are presentations made at its meetings on one or two of these, often by CA/T staff. The Committee also serves as a political sounding board, and there are often discussions about whether different

organizations and agencies are communicating adequately about specific matters (such as setting aside a site for the Massachusetts Horticultural Society) as well as broader issues such as whether public relations efforts of the project are effective or how CA/T should be interacting with impacted neighborhoods.

These five examples, both programmatic and project-specific, illustrate the Commonwealth's desire to assure that environmental quality is protected and enhanced. Transportation planning has a crucial role in the protection of environmental quality by assuring that policy makers and planners adhere to established guidelines and seek all appropriate ways to protect our natural resources.

APPENDIX A

REGIONAL TRANSPORTATION AGENCIES

BERKSHIRE COUNTY REGION

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Mayor Edward M. Reilly, Chairman
Dianne Smith, Administrator

CAPE COD REGION

Cape Cod Commission
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MARTHA'S VINEYARD REGION

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MERRIMACK VALLEY REGION

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Anthony Komornick, Transportation
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Alvin S. Topham, Chairman
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Elizabeth A. Giannini, Transportation
Program Manager

Tim Madden, Chair
Alan Gordon, Administrator

NORTHERN MIDDLESEX REGION

Northern Middlesex Council of Governments
Gallagher Terminal
Floor 3B 115 Thorndike Street
Lowell, MA 01852
Telephone: (508) 454-8021
FAX: (508) 454-8023

Lowell Regional Transit Authority
145 Thorndike Street
Lowell, MA 01852
Telephone: (508) 459-0164
FAX: (508) 458-9673

Ann Mulcahy, Chairperson
Robert W. Flynn, Executive Director
Beverly Woods, Transportation Program
Manager

Kenneth R. Stevens, Chair
Robert Kennedy, Administrator

OLD COLONY REGION

Old Colony Planning Council
70 School Street
Brockton, MA 02401
Telephone: (508) 583-1833
FAX: (508) 559-8768

Brockton Area Transit Authority
70 School Street
Brockton, MA 02401
Telephone: (508) 588-2240
FAX: (508) 584-1437

John Mather, President
Daniel M. Crane, Executive Director
Pasquale Ciaramella, Transportation Program
Manager

Mayor Winthrop H. Farwell, Jr., Chair
Reinald Ledoux, Administrator

PIONEER VALLEY REGION

Pioneer Valley Planning Commission
26 Central Street
West Springfield, MA 01089
Telephone: (413) 781-6045
FAX: (413) 732-2593

Richard E. Butler, Chairman
Timothy Brennan, Executive Director
Jeff Pechulis, Transportation Program Manager

Pioneer Valley Regional Transit Authority
2808 Main Street
Springfield, MA 01107
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Jack F. Hunter, Chair
Marlene Connor, Administrator

SOUTHEASTERN MASSACHUSETTS REGION

Southeastern Regional Planning and
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88 Broadway
Taunton, MA 02780
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Constantine Yankopoulos, Chairman
Stephen Smith, Executive Director
Roland Hebert, Transportation Program
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25 North Sixth Street
New Bedford, MA 02740
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Mayor John R. Mitchell, Chair
Lou Pettine, Administrator

Greater Attleboro - Taunton Regional Transit
Authority
Seven Mill Street
Attleboro, MA 02703
Telephone: (508) 226-1102
FAX: (508) 226-4937

Mayor Robert G. Nunes, Chair
Francis Gay, Administrator

APPENDIX B

REGIONAL PLANNING AGENCY JURISDICTIONS

BERKSHIRE COUNTY REGION

(32 Communities)

Adams	Lanesboro	Richmond
Alford	Lee	Sandisfield
Becket	Lenox	Savoy
Cheshire	Monterey	Sheffield
Clarksburg	Mount Washington	Stockbridge
Dalton	New Ashford	Tyringham
Egremont	New Marlboro	Washington
Florida	North Adams	West Stockbridge
Great Barrington	Otis	Williamstown
Hancock	Peru	Windsor
Hinsdale	Pittsfield	

CAPE COD REGION

(15 Communities)

Barnstable	Eastham	Provincetown
Bourne	Falmouth	Sandwich
Brewster	Harwich	Truro
Chatham	Mashpee	Wellfleet
Dennis	Orleans	Yarmouth

CENTRAL MASSACHUSETTS REGION

(40 Communities)

Auburn	Leicester	Shrewsbury
Barre	Mendon	Southbridge
Berlin	Millbury	Spencer
Blackstone	Millville	Sturbridge
Boylston	New Braintree	Sutton
Brookfield	Nothborough	Upton
Charlton	Northbridge	Uxbridge
Douglas	North Brookfield	Warren
Dudley	Oakham	Webster
East Brookfield	Oxford	Westborough
Grafton	Paxton	West Boylston
Hardwick	Princeton	West Brookfield
Holden	Rutland	Worcester
Hopedale		

FRANKLIN COUNTY REGION

(26 Communities)

Ashfield	Greenfield	Orange
Bernardston	Hawley	Rowe
Buckland	Heath	Shelburne
Charlemont	Leverett	Shutesbury
Colrain	Leyden	Sunderland
Conway	Monroe	Warwick
Deerfield	Montague	Wendell
Erving	New Salem	Whately
Gill	Northfield	

MARTHA'S VINEYARD REGION

(7 Communities)

Chilmark	Gosnold	West Tisbury
Edgartown	Oak Bluffs	
Gay Head	Tisbury	

MERRIMACK VALLEY REGION

(15 Communities)

Amesbury	Haverhill	Newburyport
Andover	Lawrence	North Andover
Boxford	Merrimac	Rowley
Georgetown	Methuen	Salisbury
Groveland	Newbury	West Newbury

BOSTON METROPOLITAN REGION

(101 Communities)

Acton	Hopkinton	Randolph
Arlington	Hudson	Reading
Ashland	Hull	Revere
Bedford	Ipswich	Rockland
Bellingham	Lexington	Rockport
Belmont	Lincoln	Salem
Beverly	Littleton	Saugus
Bolton	Lynn	Scituate
Boston	Lynnfield	Sharon
Boxborough	Malden	Sherborn
Braintree	Manchester-by-the-Sea	Somerville
Brookline	Marblehead	Southborough
Burlington	Marlborough	Stoneham
Cambridge	Marshfield	Stoughton
Canton	Maynard	Stow
Carlisle	Medfield	Sudbury
Chelsea	Medford	Swampscott
Cohasset	Medway	Topsfield
Concord	Melrose	Wakefield
Danvers	Middleton	Walpole
Dedham	Milford	Waltham
Dover	Millis	Watertown
Duxbury	Milton	Wayland
Essex	Nahant	Wellesley
Everett	Natick	Wenham
Foxborough	Needham	Weston
Framingham	Newton	Westwood
Franklin	Norfolk	Weymouth
Gloucester	North Reading	Wilmington
Hamilton	Norwell	Winchester
Hanover	Norwood	Winthrop
Hingham	Peabody	Woburn
Holbrook	Pembroke	Wrentham
Holliston	Quincy	

MONTACHUSETT REGION

(22 Communities)

Ashburnham

Ashby

Athol

Ayer

Clinton

Fitchburg

Gardner

Groton

Harvard

Hubbardston

Lancaster

Leominster

Lunenburg

Petersham

Phillipston

Royalston

Shirley

Sterling

Templeton

Townsend

Westminster

Winchendon

NANTUCKET REGION

(1 Community)

Nantucket

NORTHERN MIDDLESEX REGION

(9 Communities)

Billerica

Chelmsford

Dracut

Dunstable

Lowell

Pepperell

Tewksbury

Tyngsborough

Westford

OLD COLONY REGION

(15 Communities)

Abington

Avon

Bridgewater

Brockton

East Bridgewater

Easton

Halifax

Hanson

Kingston

Pembroke

Plymouth

Plympton

Stoughton

West Bridgewater

Whitman

PIONEER VALLEY REGION

(43 Communities)

Agawam	Hampden	South Hadley
Amherst	Hatfield	Southampton
Belchertown	Holland	Southwick
Blandford	Holyoke	Springfield
Brimfield	Huntington	Tolland
Chester	Longmeadow	Wales
Chesterfield	Ludlow	Ware
Chicopee	Middlefield	Westfield
Cummington	Monson	Westhampton
East Longmeadow	Montgomery	West Springfield
Easthampton	Northampton	Wilbraham
Goshen	Palmer	Williamsburg
Granby	Pelham	Worthington
Granville	Plainfield	
Hadley	Russell	

SOUTHEASTERN MASSACHUSETTS REGION

(27 Communities)

Acushnet	Lakeville	Raynham
Attleboro	Mansfield	Rehobeth
Berkley	Marion	Rochester
Carver	Mattapoisett	Seekonk
Dartmouth	Middleborough	Somerset
Dighton	New Bedford	Swansea
Fairhaven	North Attleboro	Taunton
Fall River	Norton	Wareham
Freetown	Plainville	Westport

